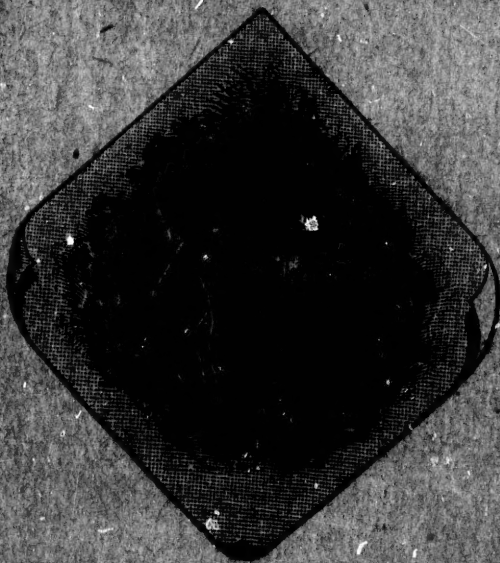


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Introduction.

In offering this little work, I hope to give reliable information, of just the sort desired, by those who are going to gold fields in any part of the world; and who have neither time nor opportunity to gather and sift it from the various sources from which I have obtained it; nor to verify it by hard work and experience, as I have done, and thus to separate matters of actual fact from false theories of titled gentlemen, passing them back without comment for correction. In composing these pages, I have tried, above all things else, to be brief and truthful and to state in common language the facts and principles which I have found use for in my seven years of experience in mining and and prospecting in the western half of the United States.

There is much that might be added to the subject matter, but it is difficult to make a strictly scientific matter plain without the use of technical terms, which again would involve an endless tangle of definition. Those, therefore, who desire technical knowledge, are respectfully referred to technical works.

There is much, also, of petty detail left out, in the belief that it is unnecessary to men of fair intelligence.

Gold Dust.

ITS CHARACTER AND VALUE.

Gold, as found in placer mines, is scarcely ever pure, and may contain silver, copper, iron lead or any other of a dozen metals, each of which makes a change in its appearance, character and value. It is usually an alloy (that is, a mixture) of gold and silver, and is worth at the United States mint from \$20.65 down to as low, in rare cases, as \$5.00 per troy ounce, United States gold coin being worth \$18.60 per ounce.

It is all shades of color, from silver white through yellow and red, to black as iron.

Gold is always heavy, being from 12 to 19 1-2 times the weight of the same bulk of water; yet thin flakes of it will float after being dried, or coated with grease of any kind.

It is nearly always tough and malleable, but is sometimes spongy and brittle when it comes from decomposed telluride ores; such, however, is malleable after melting, and is usually high grade.

How to Prospect.

In hunting for gold, some things are indispensable, though experience will suggest a substitute for many very useful tools. The dirt and gravel must be taken up and separated with care from the gold, if you are to know in what quantity the gold is present; and for this work the pick, shovel and gold pan are the tools commonly used, though some experienced prospectors take a shovel, and hatchet, or knife only, when making a long cruise with a light pack; others go still lighter, with a knife and a horn spoon or a tin cup, but one cannot learn to use such an outfit successfully in a week, and they are slow at best.

The most important tool for a beginner is a gold pan, which should be made of one piece, of Russia iron or sheet steel, pressed into shape and stiffened with a steel wire in the rim. A pressed frying pan with the handle cut off is a good substitute, if there is no grease in it.

Having found dirt likely to contain gold, and water with which to test it, take about ten pounds of dirt in the pan and put it under the water; then stir it and shake it until the mud is softened, and the gravel and sand is loose and clean, washing away the thin mud as fast as you make it. Next hold the pan half out of the water at a low angle, and shake, roll and dip it in such a manner

that the heavy parts will sink and the light parts will be washed over the side.

When you have washed it all out but the last handful, or when you begin to see a streak of black sand along the edge of the gravel, you should take care not to wash the gold over the side, which can be prevented by holding the pan flat and shaking it occasionally. When you have washed out all of the white sand and taken out the pebbles, examine the black sand carefully by rolling it around in the pan with water; and if any portion is much heavier than the rest, examine that by crushing it in your teeth, or otherwise; if it is malleable it is metal, and unless it is a piece of a bullet, may be gold.

The horn, sometimes called the great horn spoon, is useful to test a small quantity of dirt or crushed ore with, where water is scarce. It is used in about the same manner as a pan, and for the same purpose. It is made by cutting the outer arc from a cow's horn and scraping it down thin and smooth, making a boat-shaped tool holding about half a pint and weighing but a trifle.

Where to Prospect.

HOW TO FOLLOW THE TRACE.

In exploring a new country not previously prospected, the all-important question to be determined first is: Is the object you are seeking in the region you are in? The first route of exploration, and often the main line of travel, is along the river; either on the water or along the bank. If game is your object, look for tracks at the places of easiest access. If you are seeking gold, the easiest place to find the trace is among the boulders at the water's edge at low water, and at the head of the rapids.

Find a place on the low bars, where the current is strong enough to carry away all the lightest gravel when the water is up, but not strong enough to tear out the boulders as large as your

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head. If you find a few points of rough bedrock sticking up, it is the best in sight. Now, with a pick or bar, turn out a few boulders and take the sand and fine gravel from among them and pan it carefully. If you get a large handful of black sand, and not a color of gold, try two more such bars, and if they yield the same, go down the stream, for there is but a very slim chance of any pay on any branch above.

If you get some gold, but not rich to satisfy you, then hunt for some place where you can dig to bedrock, and find a layer of coarse gravel on what is or has been at some time the head of a rapid.

Dig there and test the gravel, and also clean out the crevices in the bedrock and wash the dirt. If the pay dirt is not there it is probably up the stream; perhaps up some creek or gulch, each of which you should try as you pass.

When you have found a creek that prospects better, or yields coarser gold than the river does above the mouth of it, follow it up. Take notice as to what kind of rock the gravel is made up of, and the nature of the bedrock (see chapter on formation), and when you pass a rapid or find the channel widening out, so as to form a bar on either side of the stream, try for bedrock, the same as on a river, at both ends of the bar, and don't forget the small gulches.

The best claims on a river or large creek are most likely to be where the channel is of moderate width, and the bedrock has a natural grade of seven to eighteen inches to the rod. Deep holes in a channel very rarely pay for cleaning out, theorists and professors to the contrary notwithstanding.

The best claims on a small gulch are at, and just below, the ledges and veins that furnished the gold, due allowance being made for water.

Diggings are often found on the sides and tops of hills, and if water can be obtained for working, they sometimes pay wonderfully. They are of two sorts. That is, old channels and vein out-crops.

The old channels are where streams have run in an earlier age of the earth, and while usually following the same general course as the streams of the present age, they often cross nearly at right angles, and in rare cases even run the other way. They may be good, poor or indifferent, but usually have the advantage over the modern channels of having plenty of dump. Their most common form, that of high bars near present streams, are often the best paying mines in their districts.

In some parts of the world they are covered with lava or other volcanic flow, in such a way as to puzzle the oldest inhabitant; and it takes a fine flow of speech indeed to describe them so that sensible people will think the speaker understands them.

Vein outcrops are usually richer and more profitable than the veins that they lead up to, but not always. Very much depends upon the character of the rock, and the gold is often hard to save, being in all shapes and sizes, and often coated with other mineral, or enclosed in rock, which makes crushing necessary.

Geologic Formation.

LIKELY OR NOT TO CONTAIN GOLD.

Nearly every miner is more or less tied to his own theory as to where gold is likely to be found, which is the result of his own observation and study, and, when he finds out, and is compelled to acknowledge to himself that his own pet theory is wrong, he usually contents himself with that proverb of the ancients that "Gold is where you find it," yet it remains a fact, that you are more likely to find it among some kinds of rock than among others, and it may be set down as a rule that, when all the rocks you can find in a certain region lie in horizontal layers, whether they are of slate, limestone, sandstone or lava, and the boulders in the streams consists of the same mater-

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If the hills are rounded at the top like haycocks, and boulders of porphyry and pieces of quartz are common in the streams, the stratified rocks dip under the hills, and dykes of porphyry and other eruptive rock are common, then gold is likely to be found not far away.

And the largest and best mines are usually round near where the longest and strongest traces of eruptive rock cross that part of the country rock which carries the gold. And, sometimes it is the eruptive itself which furnishes all the gold, though its step-mother, the quartz, gets the honor.

Among old-time miners it is said that "quartz is the mother of gold," and, as a matter of fact, when both are found in the same kind of country rock, on one hill, they are nearly always both in the same fissure, or vein; though either one may be found with scarcely a trace of the other. Veins containing gold, however, nearly always contain either quartz, iron or talc also, and often all of them, and many other metals, making a rock that almost anyone would recognize as ore, and with a little practice could readily trace it home, if not too much scattered. (See base ores.)

Among placer miners black sand is said to be an indication of gold. As a matter of fact, when both gold and black sand are in the bed of the same stream, where the current throw one they will throw the other also, as both are much heavier than common sand. So, in prospecting a stream, if you get one in large quantities and none of the other, you can take it for granted the other is not there.

Methods and Appliances.

Panning, heretofore described, is used in prospecting, in cleaning up and in mining, where only

a small amount of dirt is to be handled, and the facilities are not at hand for doing it any other way.

Dry washing, practical only in very dry climates, is accomplished with machines of various sorts, which it would take a book larger than this to describe. Most of them utilize the principles of a bellows blower, or fanning mill, and screen the dirt to different sizes, and blow it away, keeping the gold.

THE ROCKER.

The rocker comes next to the pan in size and capacity, and is very useful in mining on a small scale.

To build one of the ordinary size takes about 12 feet of lumber, though they may be made of any size desired, according to circumstances and material at hand. For the ordinary take a clear board 12 inches wide and about 30 inches long for the bottom. For the sides take two boards, 12 inches wide at 12 inches from one end and tapered to 11 inches at the short end, and three inches at the other, and the same length at the bottom. For the higher end a board 12 inches wide, 1 inch thick, 16 inches long at the top 14 at the bottom, will make it the right shape.

At the lower end put on a cleat not over 1 1-2 inches high. By nailing these together in the right manner you make a scoop-shaped box, 11 inches deep at one point and two inches at the farther end, 12 inches wide at the bottom and 14 at the top. Now take four boards each 4 inches wide and scant 12 inches long, nail box fashion 12 by 14 inches, and cover the bottom with a perforated screen, made by punching one-quarter inch holes in a piece of sheet iron. Now put cleats in the high end of your box, about 2 inches from the top, for the screen to rest on, and put another across the top to brace it. Next make the apron by tacking a piece of canvas on a frame that is made to fit inside the box on an angle, so

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that it will catch the sand and mud that comes through the screen and carry it to the back end of the box. The side bars of the frame should project about 2 inches beyond the canvas at the lower end, so that it will not choke up with sand. Now put cleats in the high end of your box, about 2 inches from the top, for the screen to rest on, and put another across the top to brace it. Next make the apron by tacking a piece of canvas on a frame that is made to fit inside the box on an angle, so that it will catch the sand and mud that comes through the screen and carry it to the back end of the box. The side bars of the frame should project about two inches beyond the canvas at the lower end, so that it will not choke up with sand. Now put rockers under the box, about six inches from each end and about three inches high, and put a pin in the centre of each to keep it from sliding about on the foundation when tilted from side to side. Put a handle on the top of the box to shake it with, and if you are going to mine fine gold, spread a piece of cloth on the bottom and fasten it down with cleats. Set it on a smooth foundation so that the open end is about three inches lower than the other, and you are ready for work.

Now put a shovelful of dirt in the screen and pour water on it with a dipper, shaking it meanwhile. When the mud is all washed through throw out the gravel, but save the big nuggets; also take out your apron once in a while and save the contents for panning.

Rocking is the most practical method where the necessary amount of swift running water cannot be had.

A self-dumping rocker will handle the dirt much faster than when two men are working together.

To build the simplest of the self-dumping rockers take two boxes 3 or 4 feet long and a screen long enough to cover the bottom of one of them. The boxes should be 12 inches wide and 6 inches deep, with the end closed, and mounted in a frame on

rockers, so that the sand and mud from the upper box will drop into the head of the lower, while the gravel will be carried on and dumped on the ground. The boxes, being given a grade or slant of about 1 1-2 inches to the foot, brings them a foot or so apart at the front end, where the dirt and water is put on, and the mud runs out.

The screen should be mounted in the upper box, an inch from the bottom, and extending 2 inches beyond, so as to waste the gravel, water being poured on with a big dipper, as needed, to wash the mud and gold through the holes.

Shallow riffles may be put in if needed, and a blanket should be placed in the lower box to catch the fine gold, being fastened down with cleats, or other means, as your ingenuity suggests. Such a rocker may, under favorable conditions, be made to handle four or five yards per day of dirt.

SLUICE BOXES AND RIFFLES.

These are necessary where any large amount of dirt and gravel is to be washed and the gold taken from it. They consist of boxes commonly 12 feet long, though any length may be used, and of whatever size the mine they are made for requires. They should never be less than 10 inches deep and the same wide, and for each 3 inches added to the width, add 2 to the depth.

A movable rough bottom, called riffles, is always used in them, to give the gold a place to lodge. Riffles may be made of any old thing, round poles, lumber, blocks and cobble stones being in common use, the best the writer ever used being 1 by 3 battens, set on edge lengthwise of the box, one inch apart, wedged fast with small block. Heavy rocks rolling over them soon wear them flat, however, and other styles are used for economy, and sometimes they are thought to be better for other reasons. For long strings of boxes, where a large amount of dirt and rock is run through, the cheapest style of good riffles, if timber grows near, is the block riffle, made by sawing six-inch blocks

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from a log and hewing two sides until they are
the width of the sluice box, say 18 inches, leaving
them round the other way, and setting them on
end, forcing gravel around them to wedge them
down. One or more boxes, at the head of the
string, should have riffles more open, though, to
catch the coarse gold. The main object to be kept
in view in making a set of riffles is to furnish a
hole where the gold can drop in and the running
water will wash away the sand, without having
power to raise the gold.

In all styles of washing, a string of boxes at
least 20 to 30 feet long should be used, and strings
of them a mile long are used at some large mines,
where they are cleaned up but once a year.

POLE SLUICE.

When no lumber is obtainable for making sluice
boxes, an inferior substitute, which will serve for
ground sluicing purposes, may be constructed as
follows:

Make a trench, as for boxes, three and a half
feet wide, making the bottom smooth and even.
Lay a floor of sacks or canvas, beginning at the
lower end, and lapping a little. Cover this with
small poles of even size, laying them crosswise.
Lay a straight log about 15 inches in diameter
on each end of these tight against the side of
the trench, and stake them down so that the
water cannot move them. Hew the inner side so
that nothing can catch against it or under them,
and fill the holes behind with tough clay.

BED ROCK DRAIN.

In working very flat ground it is often desirable
to drain the water from the mine, or pit, at the
same time using the lower part of the pit for dump
ground.

To do this, start a ditch at the lower end, bring-
ing it up on a grade of one inch or ore to the rod,
until bedrock is found, the dirt being shoveled in
and sluiced away, and the boulders laid in the bot-
tom of the ditch in such a way that the water will
run under and between them. A sluice fork should

be used, and all the small rock thrown on top of the boulders, thus putting a filter over the drain.

A sluice fork, which is merely a pitch fork, with nine to twelve tines an inch apart, should be in every placer miner's outfit, it being useful in getting rid of the small gravel when there is not grade or dump room to wash it away.

CHINA PUMP.

In working near large streams, it is often desirable to draw off the water from a hole several feet lower than the level of the stream. In such a case the China pump often serves to do the work. To make one, make a straight box long enough to reach from the bottom of the hole to a point from which the water will flow away, with a grade of about one foot in three.

Get a canvas belt, made of strong cloth the width of the box and long enough to pass over a pulley at each end of the box. Make buckets by riveting pieces of wood that will just fill the box, on the belt a foot apart. Operate it by connecting the upper pulley with a current wheel in the stream, making the current where wanted by wing dams if needed.

Shoveling In.

USE OF QUICKSILVER RIFFLE.

The common, and sometimes the only practical way of working low bars and river and creek diggings, is by shovelling in. For this style take two or more sluice boxes 10 inches wide, fitted with riffles of slats, or small poles. If the bottoms of your boxes are made two inches wider at one end than the other, they will be easier to set up and make tight at the joints, for this style requires frequent moving. You can then set the small end of one box in the big end of the one below, making it tight by shoving them together. Bring enough water through a ditch across the ground to be worked to fill the boxes half or two-thirds full.

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Now set the boxes near the lower end of the ditch, so as to take up all the water, and stop the leaks with rags, moss or sod, giving the boxes a grade of not less than one-third of an inch to the foot, a full inch to the foot is the best, if it leaves dump enough to carry away the tailings. Shovel in the dirt to be washed, not lower than the head of the lower box, and let nature do the rest.

Great care should be taken at all times, and especially when shovelling in, that the sand does not become packed on top of the riffles when gold is going into the boxes, as the water is likely to carry it out through into the tailings.

The tailings at the end of the last box should be tested occasionally, and if much fine gold is present, a quicksilver riffle should be put in near the head of the last box. To make this, take a straight box or piece of plank an inch narrower than the box, by two feet long, cut or saw notches across it, a half inch deep and wide, an inch apart, beginning four inches from the upper end. Put a thin strip on each side to close the ends of the notches and set in the box with the service in line with the other riffles, put some water in to see that it is not tilted to one side, and then put five or ten pounds of mercury in the upper notches, and take care not to splash it out by dropping gravel on it. If coarse gold is going through, set the box you are shoveling into nearly level, and give those below more grade to keep the riffles clear, and so that the dirt will be softened before it is carried through.

Ground Sluice.

Ground sluicing is the favorite way of working small bars and gulch diggings, where a hose is not at hand or the water supply is too low down to use one. More grade and dump room is needed for this than for shovelling in; also more water, and the dirt can be worked very much faster. Bring the water across the ground

as for shovelling in, and at the lower end dig a trench on a grade of one or one and a half inches to the foot, until the head of it is two or three feet deep; set a twelve inch or larger sluice box in and stop up the leaks, filling the trench with sod and rock around the head of the box. Now turn on the water, and with a pick help it to tear up the earth, throwing the large rock out of the way when you come to them, sending the mud, sand and gravel through the box.

If the bed rock pitches to either side, it is well to work off the higher part first, as that is hard to reach, after the lower part is stripped.

Cleaning Up.

When for any reason it is desirable to clean up, strip all gravel and loose dirt off the bed-rock, washing it down towards the boxes. When that is finished turn off the water, sending it around some other way. When the bedrock is dry take a pick and dig out all the seams and crevices and scrape them clean, shovelling the dirt always down toward the box, starting from the highest part. When the pile of dirt gets too big to handle, turn on the water and wash it through, putting in the last pile at the head of the box very slowly, to keep from clogging the riffles.

When all the gold from the race above has been washed down and is in the box, turn off all but a very little water, leaving enough to cover the bottom of the box about one fourth of an inch deep, and take up the riffle at the head of the box, washing the mud and sand down very slowly and throwing out the gravel, taking up the last of it with a small scoop and panning it. But do not take up the last riffle while there is running water in the box, unless you have a cleat over an inch high in the tail of the box to catch the gold.

Hydraulic Mining.

Is done in a manner similar to ground sluicing, but the earth is torn up with water, applied from a nozzle under high pressure, the ditch supplying the water being from 30 to 500 feet above the dirt to be washed, the water being conveyed in a pipe made of cotton or iron, according to the pressure, six inches or more in diameter. The cleaning up is nearly the same as in ground sluicing. But to give a full description of hydraulic mining would require a large book, and this is a small one to be put into your pocket.

Booming Out.

Booming is a very old English style of mining, and is used to advantage in cleaning out steep, narrow gulches, where labor is expensive and the surface dirt deep. It is accomplished by setting a string of large, strong sluice boxes in the lower part of the gulch, anchoring them firmly to the rock, and building a reservoir in the upper part, sometimes as much as half a mile distant. A large gate is put in, that will let out as much water as the boxes will carry off, usually being made automatic, so that it will open when the reservoir is full, letting out a flood of water that takes everything with it while it lasts, and gives the operator a chance to build walls and shape its course between floods, thus doing away with picking and piping except in cleaning up. They are also called self-shooters. As the gate might puzzle you to build, here are the directions:

Build a dam of sticks, stones and dirt, placing in the bottom of it a covered box one-half the size of your sluice boxes: place a gate in the head of it, to be opened by lifting. Place an overflow box on top of the dam, extending over the outside; place a lever there also, hanging the gate on one end of it, and a leaky box on the other, in such a

way that the overflow will fill the box and pull the gate up; and when the reservoir is empty, the water having leaked out of the box, the gate will slip down and close the hole, raising the box up to catch the next overflow.

Drift Mining.

PLAN AND APPLIANCES.

Drifting is an old and useful method of obtaining the pay streak, or best portion of a bed of gravel (which is usually, but not always, near bed rock), and though very expensive, is often cheaper than washing the whole bank.

The pay streak in all placer mines will be found on what was the bottom of the channel at the time when the greatest amount of gold was carried in; usually in the part where big boulders are thickest and black sand most plentiful, and is often covered deep with a deposit containing little or no gold, though sometimes the pay is all on the surface.

Having found pay dirt which is to be taken out by drifting, a tunnel should be run eight or ten feet in width and as high as the pay is thick, care being taken to get all the pay off the bottom. All of the boulders should be used in building a solid wall on one side of the tunnel or drift, both to save hauling out and to hold up the top. After building the wall in such a way as to leave a passage about four feet wide on one side, a track should be laid therein on which to run a car or wooden truck, and the top cut to a convenient height, say five to seven feet.

These drifts should be run parallel and as far apart as they are wide, and when they are extended as far as desired the pillars may be taken out by starting at the back end and taking great care not to be in the way when the top gets ready to fall. A few posts may be used at intervals to give the workmen warning, as the top starts slowly

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and the posts will snap when danger begins, and sometimes a week before. By keeping a sharp lookout for loose boulders in the top and running when the posts begin to break, fatal accidents can nearly always be avoided.

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In breaking ground in the drifts various tools are used, according to conditions. If the gravel is cemented together with lime or other mineral, powder may be used to great advantage, being inserted by making a hole with a gopher bar, drills being used when the cement is hard enough to allow it.

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A gopher bar is simply a carpenter's steel pinch bar with the ends bent an inch or more to one side, and is used to make an irregular hole between the boulders.

If no cement or frost is present, a pick and a bar are all that is needed, but the top is likely to be very treacherous.

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If the pay gravel is frozen hard and not cemented it becomes simply a matter of warming it up past the melting point, as powder is very difficult to use successfully. A mixture of clay and gravel, when frozen hard, is about the meanest stuff on earth to either drill or blast, and very salty brine must be used to keep the mud from freezing.

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The clay cuts about the same as hard beeswax, and when you strike the end of a round stone it will not cut straight with any but a diamond drill. It is also very tough, and a big charge of black powder serves to tear off but a small amount, and giant powder will not explode below 40 degrees Fahrenheit.

In drifting frozen ground the method in common use in all parts of the northern hemisphere for melting the ice is that of building fires against it, which is a partial success, but not altogether satisfactory, as the fire will smother itself with its own smoke, besides causing the top to fall if the drift is long. Steam heat should give satisfaction

if properly applied, as the writer used it with shining success for a similar purpose at the Gold Hill mill at Quartzburg, Idaho, in January, 1894.

A large amount of frozen concentrates were to be prepared for treatment by the MacArthur-Forest cyanide process, and an old rubber garden hose was attached to the boilers and the other end buried in the frozen material, contained in a tank about 30 inches deep by 10 feet square.

It was found that by moving the hose frequently the 12-ton charge could be thawed out in one to two hours. The amount of heat taken up by one pound of water in being converted into steam is nearly equal to that required to melt ten pounds of ice, and it will warm a much greater amount of dirt.

An excellent tool for drilling frozen clay or earth, either to insert powder or admit a steam pipe, is a steel twist drill made by the Prospecting Tool Company, of Stamford, Conn., for whom J. W. Bradley, of Seattle, is the Pacific coast agent. It will also give good service in prospecting in slate or limestone formation, or anywhere that there is not too much quartz or hard rock present, being especially suited to coal mine work. Steel bar drills must be used for getting through rock that is very much harder than marble, unless a diamond drill is available.

Wooden Car.

A car is often wanted in drifting, and in quartz mining places where iron trucks and trimmings are not to be had. A wooden truck built as follows is better than none:

Cut two round sticks ten inches in diameter and three feet long. Find the centre of the ends and saw around them, leaving bearings two inches long and two inches in diameter, dressing them true and smooth. Cut the flange two inches farther back, making the wheel as true as possible eight

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inches in diameter, two inches tread, with flanges an inch high. Cut away the surplus wood in the middle of the sticks, leaving only enough for strength. Make a box frame of plank or split lagging three feet square, eight inches high, and cut notches in two sides, two inches deep, for bearings, two feet apart, and babbitt them with bacon rind. Lay a platform on top and set a tub or box on that, tipping it off to empty it. Lay a track of split poles, with the bark and knots trimmed off, 22 inches inside gauge, and it is ready for straight ahead work.

By using only one roller and putting handles on the frame, a very handy truck is made, to carry twice the load of a wheelbarrow.

Cleaning the Gold.

PREPARING IT FOR MARKET TAKING OUT THE DIRT.

Cleaning up is the part of mining requiring the greatest care and attention, as many heavy and worthless minerals are found with gold which are often difficult to separate. The most common of these is the black sand, consisting of iron oxide, with many impurities. Others are lead ores, usually white or bluish in color. Ores of various other metals are also found in some places. Garnets, rubies, sapphires and diamonds are also found sometimes. A portion of the gold is usually coated with some one of the many compounds that interfere with or prevent amalgamation; and, taken altogether, it requires a good deal of common sense and some scientific knowledge to save the gold and clean it well. By careful panning the greater part of the dirt may be washed away, and the iron ore may all be taken out by stirring with a magnet under water; and by sorting and blowing carefully the other dirt may be taken out when it is dry. Or, if the gold is all bright and clean, it can be quickly separated by amalgamation with mercury.

To amalgamate, pour in with the heavy sand in a pan about three times as much quicksilver as there is gold and rub it hard with your hand, taking care first that there is no grease present, and shaking under water frequently. Then, by rolling it about in the pan, you can collect it all in one lump and slip it out into a piece of cloth, washing the sand out or leaving it in the pan as you like.

Retorting.

To clean amalgam, grind it in a mortar and wash it until it contains no sand, then put it in a piece of clean, firm cloth or buckskin and twist and squeeze it until all the free silver is strained out. Then place it an iron retort, which has been coated with chalk inside, wedge the cover down tight and set it in the fire, placing the end of the pipe in a vessel of water. When the retort has been red-hot for five minutes, tap the pipe gently and take it away. The quicksilver will be in the water.

A small retort, suitable for reducing an ounce or less of amalgam, may be made of a Scotch clay pipe and a piece of soft brick. Cut a hole in the brick so that the bowl of the pipe can be inserted over half an inch deep, and then glaze the brick by burning with salt if you like.

Wrap the amalgam in one thickness of paper, put it in the pipe and cover it with the brick. Close the joint with a little soft clay and tie a cloth around the stem or mouthpiece, forming a bag. Then burn the brick, keeping the bag wet.

If the cover of the retort does not fit tight, close the opening by putting in a thin layer of clean, stiff clay before doing the cooking. If you have no retort, put the amalgam in an old shovel, a frying pan or a hollow rock, with a piece of paper under it, and heat it red-hot, taking care not to inhale any of the fumes, as they are very poisonous. You can thus save nearly all the gold, but

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taking care it may explode.

Cleaning and Purifying Mercury.

If lead is plentiful, either as ore or metal, the mercury soon becomes foul from dissolving it, and gives all sorts of trouble, looking mouldy and stringy and turning the gold black. To clean it, keep it in contact with a strong solution of soda or lye, shaking it up frequently when not in use, changing the solution when it gets black.

Cyanide of potassium will clean it more quickly and thoroughly in the same manner, but must be handled with care, as it is a deadly poison, and will dissolve almost anything, from gold to boot leather.

Sodium Amalgam.

A most excellent article for clearing foul quicksilver is sodium amalgam, which, though very expensive, is cheaper bought than homemade. It is a mixture of mercury with metallic sodium, about the consistency of butter, and for use should be first mixed with twice its weight or more of mercury. Sodium is a very light metal, obtained from common salt, which when dropped in water, floats and immediately begins to blaze. Burning up a part of the water, it becomes caustic soda, and the hydrogen released burns in the air, forming steam.

When a little sodium is mixed with a large amount of mercury it has the effect of reducing all the metallic salts present, thus causing the mercury to amalgamate or adhere to any metal with which it comes in contact, and when water is added it is slowly decomposed, and the caustic soda formed combines with the lead, zinc and grease present, making them soluble in water.

Care should be taken when using the sodium.

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amalgam on amalgamated plates, as it is very liable to cause the gold amalgam to soften and slip off, if any is present at the time.

Gold, Silver and Other Minerals.

PRACTICAL TESTS FOR GOLD.

Gold is malleable, and can be hammered into any shape, cold. It is insoluble, except in mixed nitric and muriatic acid, nitric acid and salt, chlorine gas and water, bromide or cyanide of potassium. It melts at a white heat, if pure, and more easily if mixed with silver or lead.

It is yellow, with a reddish or green tinge if not colored by other elements.

To test it, melt it into a button, hammer it out flat and boil it in nitric acid and water for several minutes. If it comes out black there was silver in it, but heating it red-hot will make it yellow and nearly pure. Gold, and nothing else, will stand this test.

Silver may be detected in ore in a simple way, by roasting and crushing and then boiling in nitric acid which has been diluted with an equal amount of water. The boiling must be done in glass or earthenware, as the acid will dissolve iron or copper before it will the ore.

When the acid has dissolved all the soluble metal in the ore, pour it off carefully into another vessel, leaving the sand and gold, and adding an equal amount of water and a large pinch of salt. A white cloud will be seen if silver is present, which may be precipitated by putting in a piece of iron.

Several things are often mistaken for gold by the uninitiated. Among them are chalcopryrite, or copper pyrite, which is easily crushed to a dark green powder; iron pyrite, very hard, yields black powder; yellow mica, very light weight, splits in thin scales; streaks of brass from boot nails, always on the outside of the rock; shreds of copper and brass, from giant caps or elsewhere;

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and also yellow silicate of lead, called packer's gold, which is the same weight and color as fine shot, and only determined by melting with borax or crushing to powder, which makes the water yellow.

Scale of Specific Gravity.

When cleaning up a placer the variety of heavy material found often arouses the inquiry: "What is it?" The following approximate table of specific gravity, or comparative weights of an equal bulk, may help you to guess what it is:

Iridium	23
Platinum	17 to 22
Pure Gold	19.3
Gold Coin	17.6
Native Gold	12 to 19.5
Mercury	13.6
Palladium	11.8
Lead	11.4
Silver	10.5
Solder (about)	9
Cinnabar	9
Copper	8.8
Iron	7.7
Galena	7.6
Tin and Tin Ore	7.3
Zinc	7
Iron Ore	4 to 5.5
Ruby and Sapphire	4
Garnet	3 to 4
Diamond	3.5
Quartz	2.5
Other Stone, Sand and Mica	1.5 to 3
Aluminum	2.6
Water	1

Fire Test.

Water weighs a fraction over 64 pounds to the cubic foot, 32 cubic feet being a ton, equal to four feet square and two feet deep.

The following fire tests may also be useful at times:

Iridium and platinum are not affected by any common fire.

Gold, silver and palladium are melted at a white heat, without loss or change.

Mercury is volatilized, or boiled away, at a low red heat.

Lead melts at a low heat and oxidizes rapidly, forming a blue dress, or litarge, which, if heated red, becomes yellow and gives off a thin white smoke, changing again to lead if heated with soda and carbon.

Tin melts at a low heat, oxidizing to a gray infusible slag if kept hot. Tin ore infusible.

Cinnabar is composed of mercury and sulphur and passes off at a low red heat, forming a very poisonous gas.

Copper turns black, melting at a white heat, giving the fire a beautiful green color.

Zinc melts at a low heat, and if kept hot tinges the flame green, volatilizing at white heat and coating the surroundings white.

Iron oxidizes at a red heat, becoming an ore similar to black sand, which melts to a black glass with borax.

Galena, or lead sulphide, melts at a red heat, giving off a blue flame of burning sulphur. After roasting it is easily reduced to lead by melting with soda and carbon.

Ruby and sapphire are not affected by a common fire.

Garnet is melted to a glass of the same color at a high red heat.

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Diamond is not affected by a common fire, but if made hot enough, burns like coke.

Antimony passes off in thick white smoke, at a low red heat.

Lead may be taken out of gold and silver by continued fusion at a white heat on a cupel, or cup made of pulverized bone ash; plenty of air being supplied, the lead is oxidized to yellow litharge and absorbed by the bone ash.

Quartz Mining.

PAN ASSAY OR MILL RUN FOR FREE GOLD.

To test quartz or other rock for free milling gold crush it in a mortar, or, if that is not at hand, pound it in a tin can or on a rock, until it is all fine enough to go through a screen, the holes of which are one-fortieth of an inch wide, called 40 mesh. Now pan it carefully and grind the heavy concentrates with a little mercury, washing away the mud, until the mercury has gathered all the gold present. Next, clean, strain and retort the amalgam and refine the gold by boiling it in nitric acid. The gold will then be worth about \$20 per ounce, if there is no sand in it.

Chemically pure gold, being worth \$20.67 per troy ounce, and by treating a twenty-pound sample of average ore, a very close estimate of the value can be made, the cents in twenty pounds equalling the dollars in a ton.

Smelting ore must be tested by assaying, which requires more apparatus than a prospector can afford to carry. Yet tests on a small scale can be made with a blow pipe and a spirit lamp or candle, and a piece of charcoal. But that is a science of itself.

The Arrastra.

For milling ore on a small scale on the frontier the arrastra is the prospector's friend. It requires more power for the work done than almost any

other mill, but if properly handled does good work, and can be built almost any place that wood, stone, power and water can be had. To build one, set a good, solid centre post in the ground and build a tight wall of wood or stone around it, at a distance of two to six feet, according to size desired. Lay in the ring thus made a solid pavement of large cobble stones, with a small gate in the wall near the top of the pavement.

Mount an upright shaft on the centre post, with a beam overhead to steady the upper end. Put arms in the shaft, to reach out almost to the wall, about two feet high. Tie large stones to the ends of the arms, so that they will drag on the pavement. Now connect whatever sort of power is most suitable to the circumstances in such a way that it will pull the drags around the ring about four feet per second.

A great deal of ingenuity and judgment is often required to get the best results from the situation and material at hand. Having got it in shape to run, put in enough clay and small gravel to cover the bottom two or three inches deep. Pour in enough water to make it sloppy and run it for a couple of hours or more to mud up all the cracks and holes. When ready to grind ore, open the gate and let the mud run out, adding more water if needed. When empty close the gate, and without stopping the mill, put in enough ore and water to cover the bottom four or five inches deep with a mixture about as thick as mush. Grind this until the rocks are worn out, say four or five hours, and then scatter it over about twice as much mercury as there is gold in it, and after grinding another hour, add enough water to make the mud about as thick as good paste; then run slowly for an hour to let the amalgam settle. After that is done, open the gate and let the mud run out, washing it over riffles with plenty of clean water, so that no gold may get away. Put in another charge and repeat until the bottom gets worn

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smooth. To clean up, work off the sand and mud as clean as you can, and take out what amalgam can be found in the crevices; then take up the pavement and wash the rocks and all the material between in pan or sluice box, laying another rough bed for next time.

Base Ores.

WHICH REQUIRE ROASTING OR SMELTING.

The base ores of most importance to prospectors are those which contain gold, silver, copper or lead, in addition to their other elements. They are nearly always accompanied by more or less quartz, and from one to a dozen different ores are usually found in the same vein, being in separate crystals readily recognised by experienced mineralogists; color, shape, hardness and weight being the points on which they differ when found, other differences being shown when they are heated or melted. As it would make this a big book to give all the details, only a few important points are given:

Gold, though usually in the state of malleable metal, also occurs as a telluride, and it is thought by many intelligent miners that it occurs in several other chemical compounds also, chloride, bromide and arsenide being most in evidence. These are doubted by professors, however.

The most important telluride, called calaverite, is of nearly the color and weight of brass, is soft and brittle, and when scratched with a knife yields a greenish yellow powder; when heated with borax it yields 44 per cent. of its weight pure gold. It is very rare.

There are about seventeen other varieties of tellurides, containing gold in combination with other metals, in different quantities. They are from tin white to black in color, are each very rare, and all require smelting for best results.

Silver occurs metallic or native, and also in a great variety of ores, being combined with sulphur, antimony, chlorine, bromine, tellurium, arsenic and

other elements, and mixed with lead, copper, iron, zinc and other metals. The ores of silver are of all colors, those containing much sulphur being dark.

MILLING ORES—SILVER

Chloride and bromide are of a light color, varying from blue to white, yellow and brown, and resemble hard wax.

Ruby silver is a red ore of silver and antimony, nearly always accompanied by a dark ore of similar nature, which shows a bright red streak when scratched, and is sometimes called ruby silver.

Black sulphuret of silver, sometimes found in small cavities in quartz, resembles soot very much, and is nearly pure silver, combined with sulphur.

To test any of the above, heat the rock white hot in a forge, with borax, and plunge in water; beads of silver will then be visible.

Galena, the most important ore of lead, is lead blue in color, about as heavy as iron, soft, brittle, usually showing cubic crystals when broken, but when very rich in silver shows no crystals, and is called steel galena. It is a compound of 86 per cent. metal with sulphur, and when roasted in a common fire gives off a blue blaze, melts to a grayish black slag, and makes a hole in a frying pan very quickly if that is used to melt it in.

Smelting Ores.

Grey copper is an ore of lead, antimony and sulphur, with a large amount of silver and copper in it. It is gray to black in color, very soft, brittle, and melts like galena, giving off a thick white smoke of antimony when roasted.

Carbonate of lead is often found on the surface, where galena will be found deeper down. It is gray to white in color, and snaps and flies away when roasted.

To test an ore for lead, if it is dark colored, roast it to burn out the sulphur, and mix it after crushing with twice its weight of baking soda and

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carbon, which may be either sugar, flour or charcoal; melt it in a crucible or anything else you have at hand, and if it is a valuable lead ore a button of lead will be found in the slag, bright metallic at first, but soon turning dark in the air. If the button breaks on being hammered out, either bismuth, antimony or phosphorus is present.

Copper occurs in a great variety of ores, and is usually accompanied by gold and silver, making a profitable smelting ore or rock.

Black oxide of copper is a common and very rich ore. It is soft, friable, dull, brownish black, often mixed with other minerals, and usually found near the surface only. It is soluble in nitric acid, and the solution will deposit copper on iron.

Sulphides of copper occur in a variety of colors, some like gold, some like lead and others all the colors of a peacock's tail.

Other ores are carbonate, sulphate, phosphate, silicate and several less common which are known to miners as copper stain being green or blue.

Arsenical iron closely resembles pyrite or iron sulphide, but is of a lighter yellow, and is sometimes called white iron. It is of little or no value, and is a great nuisance in milling or smelting, but it often accompanies good silver and gold rock, detracting several dollars per ton from their value by adding to the cost of reduction. It is most frequently found in the neighborhood of eruptive rock of dark color.

Zinc blende, also called black jack, is like arsenical iron in value and associations, but is often mistaken for something else. It is yellow to red and black in color, resinous lustre, brittle and yields brown powder when scratched.

Common Groups of Rock and Ore

The following groups of rock and ore are so common that some take it for granted that those

mentioned in each group are always found associated, but there are many exceptions:

Talcose slate—Free gold in quartz, with traces of tellurium.

Porphyry containing many large crystals—Coarse free gold, much iron pyrite, some silver, some copper, lead, zinc.

Porphyry, fine grained or dark colored—Free gold and good concentrating ore, with some arsenic.

Porphyritic granite—Gold and silver in quartz, with some tellurium and other metals.

Syenite—Same as above.

Gneiss—Gold, silver, copper, arsenic and other metals, usually smelting ore.

Limestone—Lead, silver, sometimes gold.

Slate and soapstone—Coal, serpentine, platinum.

Porphyry, the most important rock formation to a prospector, is of eruptive origin, having been forced into its present position by volcanic forces, being usually found in dykes between walls of other rocks, which show more or less plainly the effect of upheaval. It never contains mica, but always contains crystals of feldspar, or other mineral, and may be of any color, from white, through yellow, red and green, to nearly black, more or less speckled or spotted.

Talcose slate is distinguished from common slate by a lustrous or glossy appearance.

Granite is a crystalline rock, consisting of quartz, mica and feldspar, in fine or coarse grains.

For other rocks consult any standard work on geology, or ask some old miner. The covers of this book are too small for a dictionary.

Philosophy of Glaciers.

AND THE FORMING OF PLACER MINES.

In all that region lying north of 37 degrees north latitude on the American Continent some evidence of glacial action in forming placer mines, where such exist, is to be seen, and the farther north the plainer the evidence and the more recent the action.

A glacier is simply the ice and snow which gathers around the mountain tops, sliding down slowly of its own weight into the lower regions, where it melts or breaks off and floats away in the sea as fast as it comes. Its action serves to crush and grind down its bed and carry away the dirt.

In nearly every case a moving glacier has a stream of water under it, which serves to lubricate it and to carry away the mud and sand produced by its grinding the bedrock on which it moves. A portion of the crushed material, however, is not reached by the stream, and this is pushed and rolled along until a convenient place is found for it to stop, where it remains, unless carried on by other forces. Deposits of this sort are often seen on the side of ridges opposite the mountain from which a glacier has come in some previous age, causing many to wonder how it got there.

The stream which runs under a glacier serves quite as well for washing and concentrating as though there was no glacier over it: hence, it is evident that, when a glacier is grinding down a gold bearing vein, the stream underneath will be forming a pay streak in its channel, which may or may not remain there for all time, according to subsequent conditions.

The modern stream which follows a glacier bed may, but often does not, follow the channel of the sub-glacial stream, and hence there are surprises in store for miners who have not studied the matter closely.

The crushed and washed or unwashed detritus produced by a glacier is usually to be seen in ridges more or less regular, one on each side of the bed called lateral moraines, and others between called medial moraines; and also heaped up where the lower end has rested, called terminal moraines, above which lakes are often seen.

This detritus nearly always contains a little gold. If any is in the country it came from, but until washed and concentrated by running streams, very

rarely pays for mining. It very often covers the rich sub-glacial pay streak, however, in such a way that no indication can be seen on the surface, and then, when found, old miners say: "Gold is where you find it."

The Yukon Country as Reported.

Just at the present time the most interesting subject connected with mining matters, and the one on which it is the most difficult to get reliable data, is Alaska and the Yukon basin. Many reports, much mingled with "moonshine," are at hand, but it is very difficult to pan it down and save only the truth. Here are some concentrates, however, which appear to be good, and they are submitted to time for refining, the authorities for most of it being rumor and reason:

There are three known belts of gold-bearing formation crossing the northwest country, in a direction north by west and south by east. The best known runs from the southeast coast, near Juneau, through and down the Yukon Valley to Porcupine River, and no man knows how much farther.

Another, but little known, appears to lie between the upper part of the Copper River and the Tanana River basin.

The third, and least known, from Kotzebue Sound southeasterly across the western part of Alaska.

Of these last two not enough even of rumor is at hand to warrant saying anything more than that there is gold there, which is not yet claimed or owned by men or corporations.

On the eastern, or best known belt, mining has been carried on for many years, the Treadwell mine on Douglas Island, near Juneau, having the largest stamp mill in the world. It is also known that there are many other large mines in that region, which only await capital and proper management to yield much gold. A great deal of arsenic is present in

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the ore, which, with other base minerals, prevents the college-bred miners, usually sent out by large corporations, from working it successfully, at least until they have had the conceit taken out of them, and by that time the company is usually broke.

The placer regions on the upper tributaries of the Yukon River have also been worked in a superficial way for several years, but owing to the short summer and the enormous cost of supplies, very little has been accomplished in the way of deep mining or prospecting, except during the last year or two.

The class of work that has been done there in past years is little more than skimming, the bed-rock having seldom been reached except where it is very close to the surface.

In the Autumn of 1896 very rich gravel was discovered on the small creeks tributary to the lower part of Klondike River, and, as the surface detritus covering the bedrock is only from twelve to twenty feet deep, and frozen solid, the effect will be the opening of a new era in the development of Alaska and the far north in general.

The region known to be rich at present, according to best reports obtainable, is ten or fifteen miles square, and there are all sorts of good reports as to a much greater area, and other regions will most likely develop well when tested.

The country rock throughout the region from Juneau north, where gold has been found, is metamorphic or sedimentary, much cut up with dykes and larger upheavals of eruptive rock, slate, limestone, diorite, andesite, porphyry, lava and others being reported.

On the rich gulches near the Klondike the bed-rock is reported to be slate, with plenty of evidence of volcanic upheaval to be found, especially near the summit of the divide between the Klondike River and Indian River, where the rich gulches head. It is also reported that there is but little gold in the Klondike River itself.

It is also reported that the same character of rock

formation crosses the Stewart River near the fork called McQuestin Creek, and that good wages have been made skimming the low bars on the river in that region, only the best being worked.

No report of work on the bedrock or high bars is at hand, nor is there any report as to the hill country between there and Klondike, a distance of about 150 miles, having been prospected.

The whole region, where not timbered, is covered with a coat of moss averaging six inches thick, and the rocks are literally "out of sight."

Hints on Camp Life.

When your picks are dull and there is no forge near, this may be worth doing:

Build a round furnace a foot in diameter and about three feet high, leaving a small hole at the bottom and another four inches above, using small rock and mud for the wall.

Make a fire inside and fill up the furnace to the top with dry chips and blocks.

Stick your axe in the top of a stump in such a way that you can use it for an anvil, and get your hatchet or hammer. When the lower part of the furnace is full of hot coals shove the point of your pick or drill in the upper hole and do the rest as a blacksmith would.

The Chinese have a style of bellows, or air pump, for use in blacksmithing which can be made almost anywhere or of any material, and is better than none. To make it, make a straight box eight or ten inches square, about three feet long, with the inside planed smooth. Put a piston in it and an intake valve at the closed end. A truyere and pipe and a handle and guide for the piston rod makes it complete.

To temper good steel, heat it to cherry red and plunge the part you wish to harden in water, ice or tallow, which will make it white and brittle, while the part above should be a dull red. Let the heat pass into the hard part, and as it toughens

the color will change, first to straw color or razor temper, second to light blue, or knife and spring temper, third to drab or pigeon blue, which bends before it breaks, and fourth, black, slightly malleable.

When you have the temper desired, plunge it again, taking care not to harden it where it should be left tough.

Outfit for Exploring.

A prospector's outfit for taking a first look at a new district consists of clothing and bedding according to the season, provisions for the trip, allowing two or three pounds per day, a frying pan, with which to fry meat and bake bread, a couple of cans or very light pots for boiling, tin plate, knife, fork and cup, a gold pan, a light pick and a shovel. It is well to remember that the lighter your pack the more country you can examine in a given length of time, provided your supplies are sufficient to maintain health; a few fish hooks, and, if game is plentiful, a light rifle or shotgun are worth carrying.

By building a wickiup in a dry place, just big enough to roll under, leaving one side open and making a log fire alongside, a very light bed is made sufficient in ordinary weather. To build the wickiup, set up two forked sticks about two feet high and seven feet apart and lay a pole therein; gather bark or sticks and moss to roof it over, about three feet wide, using a six-inch log for the back. Put in a few inches of dry grass or leaves and spread your bedding on that. By using a little care a bark roof can be made to keep out rain, and it reflects the heat from the fire quite well. Make a fire opposite the middle, and the lodging is ready.

A very useful piece of camp furniture is a piece of heavy canvas, seven feet by eight. Some of its many uses are, shelter tent, pack cover, cot, sail

and blanket. It should have loops sewn to it at the corners and on the border.

To make a cot of it, lace two sides together with a light rope and put in two poles for side bars. Stretch it by bracing the poles apart and rest the corners on anything handy.

A waterproof match box may be made by putting two brass shells together of nearly the same size; 44 and 45 calibre cartridges make the small ones, 8 and 10 gauge shotgun shells the larger ones.

Recipes for Camp Cooking.

To bake prospector's bread, put a pint of flour in the gold pan, add a pinch of salt, a teaspoonful of baking powder, a spoonful of sugar, and mix it well together, then add a cup of cold water, mix and knead into stiff dough. Grease the frying pan and get it hot, then press half of the dough into the bottom of the pan, making it a little thinner in the centre than around the sides; set the pan on some hot coals until a thin crust forms on the bottom, so that it will slip in the pan; now set it at an angle, facing the fire, putting any old thing under the handle to hold it up, having a fire that will turn it brown in ten or fifteen minutes, tossing it as needed.

For hunter's bread have your flour, salt and baking powder mixed together in a sack in these proportions: Flour, 5 pounds; good baking powder, 2 ounces; salt, 1 ounce. Roll down the top of the sack even with the flour, press the flour down with the hand, making a hole in the middle; pour into the hole half a pint of cold water, mix and knead into a stiff dough, and bake by placing in thin loaves on clean, hot rocks, or by holding it before the fire in small lumps on a ramrod.

BOILED BEANS, PACKER'S STYLE.

Place a vessel of water on the fire, and when it boils put in enough clean beans for one mess. Then set it off and let it stand about five minutes. Pour in cold water until you can bear your hand

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in them, and then rub the beans between your hands until the hulls come off. Pour off the hulls and water and put the beans in fresh water and boil for twenty minutes, while you are getting the other things ready. Serve with fried bacon.

Mountain baked beans—Take a kettle or tin pail, with a close-fitting cover, and fill it one-third full of clean beans. Fill it up with water and set near the fire to boil. Now dig a hole in a dry place twice the size of the pot and build a hot fire in it. When the beans have swelled and risen in the pot, pour off the water and fill it up with fresh water, adding sugar and salt to taste. Take fat bacon or salt pork, cut it into strips, while the kettle is getting hot again, and parboil it in the frying pan, and when the pot is boiling and the fire in the hole is burned down, put it in. Set the pot in the hole and fill up around it with red-hot coals; you will think the pot is going to melt, but that's all right. Now be sure to put a bunch of green twigs and leaves on top, two or three inches deep; green fir brush is the best, and cover up well with hot ashes and dirt, and lay a stone on top. Now go away and don't touch it for four hours, and as much longer as you like, fourteen hours being the proper time. When you come in you will find it still warm and juicy, if the hole was hot, the cover green and the lid tight. Treat your pot roast of venison or bear the same way.

ROAST BIRD, REFUGE STYLE.

First get your bird, either chicken, duck, goose or grouse. Draw the entrails and insert salt to taste; also a handful of cornmeal or bread crumbs. Fold the legs, wings and neck close, and tie them with bark, vine or string, roll it up in sticky mud an inch thick, and bury it deep in red-hot ashes, leaving it there for an hour, or until the mud gets dry and cracks open. You will then find it nicely baked, and the feathers will come off with the mud.

PHILOSOPHY OF FERMENTED BREAD.

The making of leavened bread is an art almost as old as, and perhaps older than history. It may be adapted to almost any circumstances, if the chemistry of it is understood.

To make it good, a thick paste is made of flour and water, with such other stuff as the cook sees fit to add, salted to taste. This paste must be induced to ferment, which may be done in a variety of ways, and a part of the starch in the flour changed to alcohol and carbonic gas, which makes it foam. The cause of fermentation is a microscopic vegetable growth, the germ or seed of which is found in a great variety of things, and is cultivated for use and called yeast; or may easily be caught from the atmosphere in low, warm climates; but not so easily in high mountains or very cold regions, as it thrives and works best at 80 degrees to 90 degrees F., and is killed at 180 degrees.

When making the paste add a little yeast, either fresh or from the last mess; or, if you have none, a portion of ripe raw fruit, grape or apple preferred; or spit on it, or put in fresh blood or urine, as the Chinese do, and set it where it will keep moderately warm until it foams up to nearly twice its bulk, but do not let it stand too long, or the alcohol will become vinegar, which must be neutralised by adding soda or other alkali.

Next take a suitable pan or trough and put in as much flour as you have of the yeast or paste, making room in the centre to pour it in and mix them. When you have them mixed, stiff enough to handle, take it on a board, and roll and knead it, working in all the flour you can, until it is stiff. Then put it back in the pan and let it rise until it cracks open. Then take it out and knead it again until it is stiff, and make it up into loaves of a size to fit your pan or oven, and about two inches thick. Make biscuit if you like, and set it to rise as before. When it is as light as desired, say four to six inches thick, put it in a suitable

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oven and regulate the heat to bake it brown in about an hour.

If at any stage of the rising the fermentation goes too far, acid will be formed and the bread will be sour and heavy; but a little soda will neutralise it, if well kneaded in.

A piece of the dough or a little of the paste serves for yeast for the next time.

A handful of sugar put in at the last kneading will make it sweet loaf or rolls.

If the paste or yeast becomes sour from neglect, or if it is not desired for bread when it is ready to mix, it will make good hot cakes. Enough soda must be added to neutralise the acid, which is largely a matter of guess work based on experience and taste. If the first cake is sour, stir in more soda. If it is yellow, add a little vinegar.

For more extended Cooking Recipes see the "Alaska Cook Book" specially arranged for Camp Cooking, to be had from Thomson Stationery Co., Vancouver, B. C. Price 60c

Cures for Illness.

When attacked with cramps in the bowels, which is likely to happen as the result of exposure or drinking ice water, or eating snow when hungry, a very good remedy for immediate use is Jamaica ginger, a small vial of which is carried by many mail carriers on snow-shoe routes.

If the cramps are not relieved with a couple of small doses no more should be taken, as it may cause other trouble and make a bad matter worse. The best remedy is to get to camp as soon as possible and wrap up in a blanket and sit on a very hot board until the pain is relieved, taking a warm drink or two, and then go to bed.

For diarrhoea, which often results from improper diet and other causes, a most effective and permanent cure is jack oak acorns, eaten alone in large doses. Another, which is very effective, and always at hand, but should not be repeated often, is this:

Mix a teaspoonful of black pepper and two teaspoonfuls of flour with water into a paste and eat it.

When your blood is too thick to circulate and your arms or feet "go to sleep," or you feel chilled by a fog, eat half a teaspoonful of cayenne pepper in a paste, or as you like it. This will thin your blood and warm you up, but should not be taken more than once a week.

When troubled with cold feet, damp socks or toe jam, from too much sweating of the soles, give your feet a warm bath and finish by rubbing them well with snow or cold water and wiping them dry. This will induce a healthy circulation in the skin and close the pores. The feet should never be warmed by a fire, except in cases of invalids, who are not exposed to the weather and do not take enough exercise to sweat.

When the ordinary mosquito is troublesome, gum camphor is useful, as it is offensive and poisonous to them.

Moisten the skin where it is exposed with tincture of camphor, which is camphor dissolved in alcohol, and the stronger it is the better.

Bacon grease will also do some good, if the other is not at hand, and will keep off ticks, gnats and flies also. Eucalyptus oil is also very effective and harmless.

Hints on Packing.

In many parts of the world domestic animals are not available for transportation at certain seasons, and in some parts they are not at any season.

Under such circumstances it often becomes necessary to carry the load yourself, which is a tiresome job, the best that can be done with it. Nearly all men can carry a load with greatest ease if it is placed on their back, high up between their shoulders, and held there by straps or loops passing over the shoulder and under the arm in such a way that the pull comes on the breast and collar bone.

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Many different styles and shapes of pack straps and man saddles have been invented, and used with more or less satisfaction. The simplest of these is a grain sack with a soft rope about four feet long. Tie the ends of the rope at the lower corners of the sack, put in your load and take a double hitch around the upper part of the sack, close to the load as possible with the middle of the rope, and put your arms through the loops.

A pack saddle, to be satisfactory, must be flexible, and rest as evenly as possible on the back and shoulders, with no extra weight over the kidneys, nor below the short ribs.

Canadian Mining Laws.

In the British dominions all mineral-bearing land is held to belong to the Crown. The exclusive right to work and to use it is granted for limited periods of time, under prescribed rules and regulations, with such fees and charges as best suits the Government.

The different provinces are under different regulations, as seem best suited to varying conditions, which are changed from time to time.

There is no appeals from the decisions of the Gold Commissioner, but there are heavy penalties in the way of forfeitures for any disregard of his commands.

A quartz claim in British Columbia or the North West Territory is 1,500 feet square, the corners being all right angles, and overlapping claims are strictly forbidden.

The regulations governing placer mining prescribe claims of various sizes, according to situation and richness of district, and are changed from time to time to suit changing conditions.

Development work must be carried on continuously on mining claims. Absence or suspension of work for more than 72 hours, except in cases of sickness, forfeits the claim, unless leave of absence has been granted by the Gold Commissioner.

All persons employed in or around mines on Crown lands are required to pay a license fee annually, and to keep the receipt therefor, called a miner's certificate, in their possession.

Failure to pay the license on part of owner or employee forfeits the owner's rights in the mine.

Free miners, meaning persons over 18 years of age, and corporations, who have paid the license, are permitted to kill game, cut timber for mining and boat building purposes and to find, claim and work mines on Crown lands.

At the present time the free miner's license in the North West Territory, or Yukon district, is \$10 per year. Notices of location must be recorded and a fee of \$15 paid.

Gulch claims may cover 250 feet of the gulch, and other claims are in proportion.

Each alternate group of ten claims are reserved for use and sale by the Government.

A royalty tax of 10 per cent. must be paid on the output in excess of \$2,500 per year from each claim, the sum of \$2,500 from each claim being exempt.

U. S. Mining Laws.

The following points of United States mining law are worth taking along:

A placer claim may cover twenty acres or less, and may be based on discovery of gold dust, stream tin, cinnabar or other valuable mineral not in place.

All angles in the lines of placer claims shall be plainly marked on the ground with posts or monuments of stone.

A notice shall be placed on the claims stating: Name of claim, name of locator, date of location, and describing boundaries and landmarks, so that they may be readily found by other persons.

One hundred dollars worth of labor and improvements shall be expended on each claim of twenty

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acres or less, each year. Expenditure of \$500 must be made on each claim before a patent shall be issued.

None but citizens of the United States, or those who have declared their intention of becoming such, may locate or hold a claim on any United States Government land.

Aliens may lease mines, or other sources of wealth, on the public domain; but by purchase do not obtain valid title or claim thereto, unless patent has first been issued to a citizen or corporation.

Quartz claims shall not be more than 1,500 feet long on the course of a vein, or ledge, nor more than 300 feet wide on either side thereof; nor shall more than one claim be made on one discovery of mineral-bearing rock in place.

A quartz claim is not valid unless mineral bearing rock is found in place.

Copper and iron ore are not subject to the laws applying to quartz mines.

A notice of location shall be placed at point of discovery, and shall state name of locator, name of claim, date of location, and describe boundaries and course of centre line.

Water rights may be obtained by posting a notice of intention to use at the point where the water to be diverted from its natural bed of course, stating amount of water claimed, purpose for which it is to be used, place of use, method of diversion and name and residence of claimant; and by diverting said water within a reasonable time, according to the amount thereof.

Non-use of a ditch or other method of diversion for three consecutive years forfeits the water right connected therewith; but all improvements on the public domain are personal property of the owner.

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REGULATIONS

Governing Placer Mining in the Provisional District of Yukon, Northwest Territories.

(Approved by Order in Council of 18th Jan , 1898.)

INTERPRETATION.

"Free miner" shall mean a male or female over the age of eighteen but not under that age, or joint stock company, named in, and lawfully possessed of, a valid existing free miner's certificate, and no other.

"Legal post" shall mean a stake standing not less than four feet above the ground and flatted on two sides for at least one foot from the top. Both sides so flatted shall measure at least four inches across the face. It shall also mean any stump or tree cut off and flatted or faced to the above height and size.

"Close season" shall mean the period of the year during which placer mining is generally suspended. The period to be fixed by the Mining Recorder in whose district the claim is situated.

"Mineral" shall include all minerals whatsoever other than coal.

"Joint Stock Company" shall mean any company incorporated for mining purposes under a Canadian charter or licensed by the Government of Canada.

"Mining Recorder" shall mean the official appointed by the Gold Commissioner to record applications and grant entries for claims in the Mining Divisions into which the Commissioner may divide the Yukon District.

FREE MINERS AND THEIR PRIVILEGES.

1. Every person over, but not under eighteen years of age, and every joint stock company, shall

be entitled to all the rights and privileges of a free miner, under these regulations and under the regulations governing quartz mining, and shall be considered a free miner upon taking out a free miner's certificate. A free miner's certificate issued to a joint stock company shall be issued in its corporate name. A free miner's certificate shall not be transferable.

2. A free miner's certificate may be granted for one year to run from the date thereof or from the expiration of the applicant's then existing certificate, upon the payment therefor of the sum of \$100.00, unless the certificate is to be issued in favor of a joint stock company, in which case the fee shall be fifty dollars for a company having a nominal capital of \$100,000 or less, and for a company having a nominal capital exceeding \$100,000, the fee shall be one hundred dollars. Only one person or joint stock company shall be named in a certificate.

3. A free miner's certificate shall be on the following form:—

DOMINION OF CANADA.

Free Miner's Certificate.

(Non-transferable).

Date..... No.....

Valid for one year only.

This is to certify that.....of.....has paid me this day the sum of.....and is entitled to all the rights and privileges of a free miner, under any mining regulations of the Government of Canada, for one year from the..... day of.....18....

This certificate shall also grant to the holder thereof the privilege of fishing and shooting, subject to the provisions of any Act which has been passed, or which may hereafter be passed for the protection of game and fish; also the privilege of cutting timber for actual necessities, for building houses, boats, and for general mining operations; such timber, however, to be for the exclusive use

of the miner himself, but such permission shall not extend to timber which may have been heretofore or which may hereafter be granted to other persons or corporations.

4. Free miner's certificates may be obtained by applicants in person at the Department of the Interior, Ottawa, or from the agents of Dominion Lands at Winnipeg, Manitoba; Calgary, Edmonton, Prince Albert, in the North West Territories; Kamloops and New Westminster, in the Province of British Columbia; at Dawson City in the Yukon District; also from agents of the Government at Vancouver and Victoria, B. C., and at other places which may from time to time be named by the Minister of the Interior.

5. If any person or joint stock company shall apply for a free miner's certificate at the agent's office during his absence, and shall leave the fee required by these regulations, with the officer or other person in charge of said office, he or it shall be entitled to have such certificate from the date of such application; and any free miner shall at any time be entitled to obtain a free miner's certificate commencing to run from the expiration of his then existing free miner's certificate, provided that when he applies for such certificate he shall produce to the agent, or in case of his absence shall leave with the officer or other person in charge of the agent's office, such existing certificate.

6. If any free miner's certificate be accidentally destroyed or lost, the owner thereof may, on payment of a fee of two dollars, have a true copy of it, signed by the agent, or other person by whom or out of whose office the original was issued. Every such copy shall be marked "Substituted Certificate"; and unless some material irregularity be shown in respect thereof, every original or substituted free miner's certificate shall be evidence of all matters therein contained.

7. No person or joint stock company will be recognised as having any right or interest in or to any placer claim, quartz claim, mining lease, bed-

rock flume grant, or any minerals in any ground comprised therein, or in or to any water right, mining ditch, drain tunnel, or flume, unless he or it and every person in his or its employment shall have a free miner's certificate unexpired. And on the expiration of a free miner's certificate the owner thereof shall absolutely forfeit all his rights and interest in or to any placer claim, mining lease, bed-rock flume grant, and any minerals in any ground comprised therein, and in or to any and every water right, mining ditch, drain, tunnel, or flume, which may be held or claimed by such owner of such expired free miner's certificate, unless such owner shall, on or before the day following the expiration of such certificate, obtain a new free miner's certificate. Provided, nevertheless, that should any co-owner fail to keep up his free miner's certificate, such failure shall not cause a forfeiture or act as an abandonment of the claim, but the interest of the co-owner who shall fail to keep up his free miner's certificate shall, ipso facto, be and become vested in his co-owners, pro rata according to their former interests; provided, nevertheless, that a shareholder in a joint stock company need not be a free miner, and, though not a free miner, shall be entitled to buy, sell, hold, or dispose of any shares therein.

8. Every free miner shall, during the continuance of his certificate, but not longer, have the right to enter, locate, prospect, and mine for gold and other minerals upon any lands in the Yukon District, whether vested in the Crown or otherwise, except upon Government reservations for town sites, land which is occupied by any building, and any land falling within the curtilage of any dwelling house, and any land lawfully occupied for placer mining purposes, and also Indian reservations.

9. Previous to any entry being made upon lands lawfully occupied, such free miner shall give adequate security, to the satisfaction of the Mining Recorder, for any loss or damage which may be

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caused by such entry; and after such entry he shall make full compensation to the occupant or owner of such lands for any loss or damage which may be caused by reason of such entry; such compensation, in case of dispute, to be determined by a court having jurisdiction in mining disputes, with or without a jury.

NATURE AND SIZE OF CLAIMS.

10. A creek or gulch claim shall be 250 feet long measured in the general direction of the creek or gulch. The boundaries of the claim which run in the general direction of the creek or gulch shall be lines along bed or rim rock three feet higher than the rim or edge of the creek, or the lowest general level of the gulch within the claim, so drawn or marked as to be at every point three feet above the rim or edge of the creek or the lowest general level of the gulch, opposite to it at right angles to the general direction of the claim for its length, but such boundaries shall not in any case exceed 1,000 feet on each side of the centre of the stream or gulch. (See Diagram No. 1.)

11. If the boundaries be less than one hundred feet apart horizontally, they shall be lines traced along bed or rim rock one hundred feet apart horizontally, following as nearly as practicable the direction of the valley for the length of the claim. (See Diagram No. 2.)

12. A river claim shall be situated only on one side of the river and shall not exceed 250 feet in length, measured in the general direction of the river. The other boundary of the claim which runs in the general direction of the river shall be lines along bed or rim rock three feet higher than the rim or ledge of the river within the claim so drawn or marked as to be at every point three feet above the rim or edge of the river opposite to it at right angles to the general direction of the claim for its length, but such boundaries shall not in any case

be less than 250 feet, or exceed a distance of 1,000 feet from low water mark of the river. (See Diagram No. 3.)

13. A "hill claim" shall not exceed 250 feet in length, drawn parallel to the main direction of the stream or ravine on which it fronts. Parallel lines drawn from each end of the base at right angles thereto, and running to the summit of the hill (provided the distance does not exceed 1,000 feet), shall constitute the end boundaries of the claim.

14. All other placer claims shall be 250 feet square.

15. Every placer claim shall be as nearly as possible rectangular in form, and marked by two legal posts firmly fixed in the ground in the manner shown in diagram No. 4. The line between the two posts shall be well cut out so that one post may, if the nature of the surface will permit, be seen from the other. The flatted side of each post shall face the claim, and on each post shall be written on the side facing the claim, a legible notice stating the name or number of the claim, or both if possible, its length in feet, the date when staked, and the full christian and surname of the locator.

16. Every alternate ten claims shall be reserved for the Government of Canada. That is to say when a claim is located, the discover's claim and nine additional claims adjoining each other and numbered consecutively will be open for registration. Then the next ten claims of 250 feet each will be reserved for the Government, and so on. The alternate group of claims reserved for the Crown shall be disposed of in such manner as may be decided by the Minister of the Interior.

17. The penalty for trespassing upon a claim reserved for the Crown, shall be immediate cancellation by the Mining Recorder of any entry or entries which the person trespassing may have obtained, whether by original entry or purchase, for a mining claim, and the refusal by the Mining Recorder of the acceptance of any application which the person trespassing may at any time

make for a claim. In addition to such penalty, the Mounted Police, upon a requisition from the Mining Recorder to that effect, shall take the necessary steps to eject the trespasser.

18. In defining the size of the claims, they shall be measured horizontally irrespective of inequalities on the surface of the ground.

19. If any free miner or party of free miners discover a new mine, and such discovery shall be established to the satisfaction of the Mining Recorder, creek, river, or hill, claims of the following size shall be allowed, namely:—

To one discoverer, one claim, 500 feet in length.

To a party of two discoverers, two claims, amounting together to 1,000 feet in length.

To each member of a party beyond two in number, a claim of the ordinary size only.

20. A new stratum of auriferous earth or gravel situated in a locality where the claims have been abandoned shall for this purpose be deemed a new mine, although the same locality shall have been previously worked at a different level.

21. The forms of application for a grant for placer mining, and the grant of the same, shall be those contained in Forms "H" and "I" in the schedule hereto.

22. A claim shall be recorded with the Mining Recorder in whose district it is situated, within ten days after the location thereof, if it is located within ten miles of the Mining Recorder's office. One extra day shall be allowed for every additional ten miles or fraction thereof.

23. In the event of the claim being more than one hundred miles from a Recorder's office, and situated where other claims are being located, the free miners, not less than five in number, are authorised to meet and appoint one of their number a "Free Miners' Recorder," who shall act in that capacity until a Mining Recorder is appointed by the Gold Commissioner.

24. The "Free Miners' Recorder" shall at the earliest possible date after his appointment, notify

the nearest Government Mining Recorder thereof, and upon the arrival of the Government Mining Recorder, he shall deliver to him his records and the fees received for recording the claims. The Government Mining Recorder shall then grant to each free miner whose name appears in the records, an entry for his claim on form "I" of these regulations, provided an application has been made by him in accordance with form "H" thereof. The entry to date from the time the "Free Miners' Recorder" recorded the application.

25. If the "Free Miners' Recorder" fails within three months to notify the nearest Government Mining Recorder of his appointment, the claims which he may have recorded will be cancelled.

26. During the absence of the Mining Recorder from his office, the entry for a claim may be granted by any person whom he may appoint to perform his duties in his absence.

27. Entry shall not be granted for a claim which has not been staked by the applicant in person in the manner specified in these regulations. An affidavit that the claim was staked out by the applicant shall be embodied in form "H" in the schedule hereto.

28. An entry fee of fifteen dollars shall be charged the first year, and an annual fee of fifteen dollars for each of the following years. This provision shall apply to claims for which entries have already been granted.

29. A statement of the entries granted and fees collected shall be rendered by the Mining Recorder to the Gold Commissioner at least every three months, which shall be accompanied by the amount collected.

30. A royalty of ten per cent. on the gold mined shall be levied and collected on the gross output of each claim. The royalty may be paid at banking offices to be established under the auspices of the Government of Canada, or to the Gold Commissioner, or to any Mining Recorder authorised by him. The sum of \$2,500.00 shall be

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deducted from the gross annual output of a claim when estimating the amount upon which royalty is to be calculated, but this exemption shall not be allowed unless the royalty is paid at a banking office or to the Gold Commissioner or Mining Recorder. When the royalty is paid monthly or at longer periods, the deduction shall be made rateable on the basis of \$2,500 per annum for the claim. If not paid to the bank, Gold Commissioner or Mining Recorder, it shall be collected by the customs officials or police officers when the miner passes the posts established at the boundary of a district. Such royalty to form part of the consolidated revenue, and to be accounted for by the officers who collect the same in due course. The time and manner in which such royalty shall be collected shall be provided for by regulations to be made by the Gold Commissioner.

31. Default in payment of such royalty, if continued for ten days after notice has been posted on the claim in respect of which it is demanded, or in the vicinity of such claim, by the Gold Commissioner or his agent, shall be followed by cancellation of the claim. Any attempt to defraud the Crown by withholding any part of the revenue thus provided for, by making false statements of the amount taken out, shall be punished by cancellation of the claim in respect of which fraud or false statements have been committed or made. In respect to the facts as to such fraud or false statements or non-payment of royalty, the decision of the Gold Commissioner shall be final.

32. After the recording of a claim the removal of any post by the holder thereof or by any person acting in his behalf for the purpose of changing the boundaries of his claim, shall act as a forfeiture of the claim.

33. The entry of every holder of a grant for placer mining must be renewed and his receipt relinquished and replaced every year, the entry fee being paid each time.

34. The holder of a creek, gulch or river claim

may, within sixty days after staking out the claim, obtain an entry for a hill claim adjoining it, by paying to the Mining Recorder the sum of one hundred dollars. This permission shall also be given to the holder of a creek, gulch or river claim obtained under former regulations, provided that the hill claim is available at the time an application is made therefor.

35. No miner shall receive a grant of more than one mining claim in a mining district, the boundaries of which shall be defined by the Mining Recorder, but the same miner may also hold a hill claim, acquired by him under these regulations in connection with a creek, gulch, or river claim, and any number of claims by purchase; and any number of miners may unite to work their claims in common, upon such terms as they may arrange, provided such agreement is registered with the Mining Recorder and a fee of five dollars paid for each registration.

36. Any free miner or miners may sell, mortgage, or dispose of his or their claims, provided such disposal be registered with, and a fee of two dollars paid to the Mining Recorder, who shall thereupon give the assignee a certificate in the form "A" in the schedule hereto.

37.—Every free miner shall during the continuance of his grant have the exclusive right of entry upon his own claim for the miner-like working thereof, and the construction of a residence thereon, and shall be entitled exclusively to all the proceeds realised therefrom, upon which, however, the royalty prescribed by these regulations shall be payable: provided that the Mining Recorder may grant to the holders of other claims such right of entry thereon as may be absolutely necessary for the working of their claims, upon such terms as may to him seem reasonable. He may also grant permission to miners to cut timber thereon for their own use.

38. Every free miner shall be entitled to the use of so much of the water naturally flowing

through or past his claim, and not already lawfully appropriated, as shall, in the opinion of the Mining Recorder be necessary for the due working thereof, and shall be entitled to drain his own claim free of charge.

39. A claim may be deemed to be abandoned and open to occupation and entry by any person when the same shall have remained unworked on working days, excepting during the close season, by the grantee thereof or by some person on his behalf for the space of * seventy-two hours, unless sickness or other reasonable cause be shown to the satisfaction of the Mining Recorder, or unless the grantee is absent on leave given by the Mining Recorder, and the Mining Recorder, upon obtaining evidence satisfactory to himself, that this provision is not being complied with, may cancel the entry given for a claim.

40. If any cases arise for which no provision is made in these regulations, the provisions of the regulations governing the disposal of mineral lands other than coal lands, approved by His Excellency the Governor in Council on the 9th of November, 1889, or such other regulations as may be substituted therefor, shall apply.

FORM H.—APPLICATION FOR GRANT FOR PLACER MINING, AND AFFIDAVIT OF APPLICATION.

I (or we).....of.....hereby apply, under the Yukon Placer Mining Regulations, for a grant of a claim for placer mining as defined in the said regulations, in (here describe locality) and I (or we) solemnly swear:—

1. That from indications I (or we) have observed on the claim applied for, I (or we) have reason to believe that there is therein a deposit of gold.

2. That I (or we) am (or are) to the best of my (or our) knowledge and belief the first to observe such indications, or:—

3. That the said claim was previously granted

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to (here name the last grantee) but has remained unworked by the said grantee for not less than.....

4. That I (or we) am (or are) unaware that the land is other than vacant Dominion Lands.

5. That I (or we) did on the.....day ofmark out on the ground, in accordance in every particular with the provisions of the mining regulations for the Yukon District, the claim for which I (or we) make this application, and in so doing I (or we) did not encroach on any other claim or mining location previously laid out by any other person.

* 72 hours means three consecutive days of 24 hours each.

6. That the length of the said claim, as nearly as I (or we) could measure is.....feet, and that the description of this date hereto attached, signed by me (or us) sets (or set) forth in detail, to the best of my (or our) knowledge and ability, its position.

7. That I (or we) make this application in good faith, to acquire the claim for the sole purpose of mining to be prosecuted by myself (or us) or by myself and associates, or by my (or our) assigns.

Sworn before me
at.....
this.....day
of.....18....

(Signature)

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FORM I.—GRANT FOR PLACER MINING.

No.....

Department of the Interior,

Agency.....18....

In consideration of the payment of the fee of fifteen dollars prescribed by clause 28 of the mining regulations for the Yukon District, by.....
(A. B.).....of.....accompanying his

(or their) application No. dated
18...., for a mining claim in..... (here insert
description of locality.)

The Minister of the Interior hereby grants to the
said..... (A. B.) for the term of
one year from the date hereof, the exclusive right
of entry upon the claim..... (here describe in
detail the claim granted) for the miner-like work-
ing thereof, and the construction of a residence
thereon, and the exclusive right to all the proceeds
realised therefrom, upon which, however, the
royalty prescribed by the regulations shall be paid.

The said..... (A. B.) shall be
entitled to the use of so much of the water natural-
ly flowing through or past his (or their) claim,
and not already lawfully appropriated, as shall be
necessary for the due working thereof, and to
drain his (or their) claim, free of charge.

This grant does not convey to the said.....
(A. B.) any right of ownership in the soil covered
by the said claim, and the said grant shall lapse
and be forfeited unless the claim is continuously
and in good faith worked by the said.....
(A. B.) or his (or their) associates.

The rights hereby granted are those laid down in
the aforesaid mining regulations, and no more, and
are subject to all the provisions of the said regu-
lations, whether the same are expressed herein or
not.

.....
Mining Recorder.

FORM J.—CERTIFICATE OF THE ASSIGN-
MENT OF A PLACER MINING CLAIM.

No.

Department of the Interior,

Agency.....18....

This is to certify that..... (B. C.)
of..... has (or have) filed an assignment in
due form dated.....18.... and accompanied
by a registration fee of two dollars, of the grant to
..... (A. B.) of of the

right to mine in....(here insert description of claim)....for one year from the.....18....

This certificate entitles the said.....(B. C.)
.....to all the rights and privileges of the said
.....(A. B.).....in respect to the claim assigned, that is to say, to the exclusive right of entry upon the said claim for the miner-like working thereof and the construction of a residence thereon, and the exclusive right to all the proceeds realised therefrom (upon which, however, the royalty prescribed by the regulations shall be paid), for the remaining portion of the year for which the said claim was granted to the said.....(A. B.)
.....that is to say, until the.....day of.....18....

The said.....(B. C.).....shall be entitled to the use of so much of the water naturally flowing through or past his (or their) claim and not already lawfully appropriated, as shall be necessary for the due working thereof and to drain his claim, free of charge.

This grant does not convey to the said.....
(B. C.).....any right of ownership in the soil covered by the said claim, and the said grant shall lapse and be forfeited unless the claim is continuously and in good faith worked by the said.....(E. C.).....or his (or their) associates,

The rights hereby granted are those laid down in the Yukon Placer Mining Regulations, and no more, and are subject to all the provisions of the said regulations, whether the same are expressed herein or not.

.....
Mining Recorder.

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REGULATIONS

Governing the issue of Leases to dredge for
Minerals in the beds of rivers in the
Provisional District of Yukon
Northwest Territories.

(Approved of by Order in Council No. 125, of the 18th
January, 1898)

The following regulations are adopted for the issue of leases to persons or companies who have obtained a free miner's certificate in accordance with the provisions of the regulations governing placer mining in the Provincial District of Yukon, to dredge for minerals other than coal in the submerged beds or bars of rivers in the Provisional District of Yukon, in the North West Territories:--

1. The lessee shall be given the exclusive right to subaqueous mining and dredging for all minerals with the exception of coal in and along an unbroken extent of five miles of a river following its sinuosities, to be measured down the middle thereof, and to be described by the lessee in such manner as to be easily traced on the ground; and although the lessee may also obtain as many as five other leases, each for an unbroken extent of five miles of a river, so measured and described, no more than six such leases will be issued in favor of an individual or company, so that the maximum extent of river in and along which any individual or company shall be given the exclusive right above mentioned, shall under no circumstances exceed thirty miles. The lease shall provide for the survey of the leasehold under instructions from the Surveyor General, and for the filing of the returns of survey in the Department of the Interior within one year from the date of the lease.

2. The lease shall be for a term of twenty years;

at the end of which time all rights vested in, or which may be claimed by the lessee under his lease, are to cease and determine. The lease may be renewable, however, from time to time thereafter in the discretion of the Minister of the Interior.

3. The lessee's right of mining and dredging shall be confined to the submerged beds or bars in the river below low water mark, that boundary to be fixed by its position on the first day of August in the year of the date of the lease.

4. The lease shall be subject to the rights of all persons who have received or who may receive entries for claims under the Placer Mining Regulations.

5. The lessee shall have at least one dredge in operation upon the five miles of river leased to him, within two seasons from the date of his lease, and if, during one season when operations can be carried on, he fails to efficiently work the same to the satisfaction of the Minister of the Interior, the lease shall become null and void unless the Minister of the Interior shall otherwise decide. Provided that when any company or individual has obtained more than one lease, one dredge for each fifteen miles or portion thereof shall be held to be compliance with this regulation.

6. The lessee shall pay a rental of \$100.00 per annum for each mile of river so leased to him. The lessee shall also pay to the Crown a royalty of ten per centum on the output in excess of \$15,000.00, as shown by sworn returns to be furnished monthly by the lessee to the Gold Commissioner during the period that dredging operations are being carried on: such royalty, if any, to be paid with each return.

6. The lessee who is the holder of more than one lease shall be entitled to the exemption as to royalty provided for by the next proceeding regulation to the extent of \$15,000.00 for each five miles of river for which he is the holder of a lease: but the lessee under one lease shall not be entitled to the exemption as to royalty provided by the next

two proceeding regulations, where the dredge or dredges used by him have been used in dredging by another lessee, or in any case in respect of more than thirty miles.

7. The lessee shall be permitted to cut free of all dues, on any land belonging to the Crown, such timber as may be necessary for the purposes of his lease, but such permission shall not extend to timber which may have been heretofore or may hereafter be granted to other persons or corporations.

8. The lessee shall not interfere in any way with the general right of the public to use the river in which he may be permitted to dredge, for navigation and other purposes; the free navigation of the river shall not be impeded by the deposit of tailings in such manner as to form bars or banks in the channel thereof, and the current or stream shall not be obstructed in any material degree by the accumulation of such deposit.

9. The lease shall provide that any person who has received or who may receive entry under the Placer Mining Regulations shall be entitled to run tailings into the river at any point thereon, and to construct all works which may be necessary for properly operating and working his claim. Provided that it shall not be lawful for such person to construct a wing-dam one thousand feet from the place where any dredge is being operated, nor to obstruct or interfere in any way with the operation of any dredge.

10. The lease shall reserve all roads, ways, bridges, drains, and other public works, and all improvements now existing, or which may hereafter be made in, upon or under any part of the river, and the power to enter and construct the same, and shall provide that the lessee shall not damage nor obstruct any public ways, drains, bridges, works and improvements now or hereafter to be made upon, in, over, through, or under the river; and that he will substantially bridge or cover and protect all the cuts, flumes, ditches and sluices, and all pits and dangerous places at all points

where they may be crossed by a public highway or frequented path or trail, to the satisfaction of the Minister of the Interior.

11. That the lessee, his executors, administrators, or assigns, shall not nor will assign, transfer or sublet the demised premises, or any part thereof, without the consent in writing of the Minister first had and obtained.

The Thomson Stationery Co., Ltd., Vancouver, B. C., publish all the Mining and Conveyancing Forms for use in the Northwest Territories of Canada, among others the following are largely used by Miners:

LAW FORMS

FOR THE

NORTHWEST TERRITORIES

PUBLISHED BY

THOMSON STATIONERY CO., LD.

VANCOUVER, B. C.

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MINING FORMS.

		hundred	doz	
621 ½ Cap	Application for Grant for Placer Mining	\$ 1 00	25	536
626 A	Location Notice, Post No 1		25	537
626 B	“ “ Post No 2		25	539
620 ½ Cap	Bill of Sale Mineral Claim	1 00	25	545
123 Cap	Option on Mining Claim..		50	550
124 “	Bond for Mineral Claim....		50	552
127 ½ Cap	Mineral Claims Listed for Sale	1 00	25	555
132 Demy	Pay Roll Sheets for Mining Companies	4 00	75	560
134 ¼ Cap	Proxy Form for Joint Stock Companies	75	15	

No.

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Conveyancing Forms.

No.	Size		hundred dozi
502	½ Cap	Transfer of Land.....\$	50
504	"	Mortgage, long form.....	50
505	"	" short form.....	50
506	"	Chattel Mortgage (to secure Promissory Note).....	50
507	Cap	Chattel Mortgage (to secure the sum of).....	50
508	"	Lease, short form	50
511	½ Cap	Quit Claim Deed.....	50
513	"	Bill of Sale.....	50
514	"	Deed of Co-Partnership, 10c	1 00
517	Crown	Assignment for benefit of Creditors	50
518	"	Assignment in Trust.....	50
521	Cap	Assignment Chattel M'tgage	35
527	"	Agreement for Sale of Land	35
528	½ Cap	Agreement for Sale of Land short form.....	25
531	Cap	Bond to Convey.....	35
532	"	Power of Attorney (gen form)	35
533	½ Cap	Power of Attorney (short form, general)	25
534	"	Power of Attorney (short form, special).....	25
536	"	Discharge of Chattel M'tge	25
537	"	" Mortgage.....	25
539	Cap	Building Contract, 10c ea.	1 00
545	½ Cap	Notice of Sale under M'tge	1 00 25
550	¼ Cap	Affidavit for Witness.....	75 15
552	"	" Attorney.....	75 15
555	"	" Secretary of a Corporation	75 15
560	½ Cap	Notice to Incumbrancers ...	1 00 25

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Customs Forms.

			hundred	dol
135	½ Cap	For Duty, B 1.....	\$ 1 00	25
135 A	"	" Goods imported		
		from Great Britain.....	1 00	25
136	½ Cap	Free, B 2.....	1 00	25
137	"	Settler's Effects, Free, B 4	1 00	25
138	"	For Warehouse, B 5.....	1 00	25
139	"	To Perfect Warehouse Entry		
		B 6.....	1 00	25
140	"	For Duty Ex-Warehouse B 7	1 00	25
141	"	Free Ex-Warehouse B 8..	1 00	25
142	"	For Export Ex-Warehouse B 9	1 00	25
143	"	For Removal Ex-W., B 10	1 00	25
146 A	"	Entry Outwards, goods the		
		produce or manufacture of		
		Canada, B 13.....	1 00	25
146	"	Export Entry.....	1 00	25
147	"	Entry Outwards, goods not		
		the produce or manufacture		
		of Canada, B 14.....	1 00	25
148	"	Bill of Sale in Bond, (cus-		
		toms transfer invoice) B 15	1 00	25
149	"	Report Inwards, A 6.....	1 00	25
150	"	" Outwards, A 7.....	1 00	25
151	"	For Duty, spirits, D 4, excise	1 00	25
155	¼ Cap	Collector's Warrant for De-		
		livery of Goods ex ship. C 1	75	15
156	"	Collector's Landing Warrant		
		for Bonded Warehouse, C 2	75	15
157	"	Locker's Receiving Order, C 3	75	15
158	"	" Delivery Order, C 4	75	15
159	"	Permission Required, C 6..	75	15
160	"	Report Inwards, Coastwise,		
		A 9.....	75	15
161	"	Report Outwards, Coastwise,		
		A 10.....	75	15

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		hundred doz	
162 ¼ Cap	Appointment of Attorney or Agent for making Customs Enty, E 4.....	\$ 75	15
165 ½ Cap	Entry Outwards for Shipping to the Yukon Dist, N.W.T.	1 co	25
164 ¼ Cap	Bill of Health	75	15

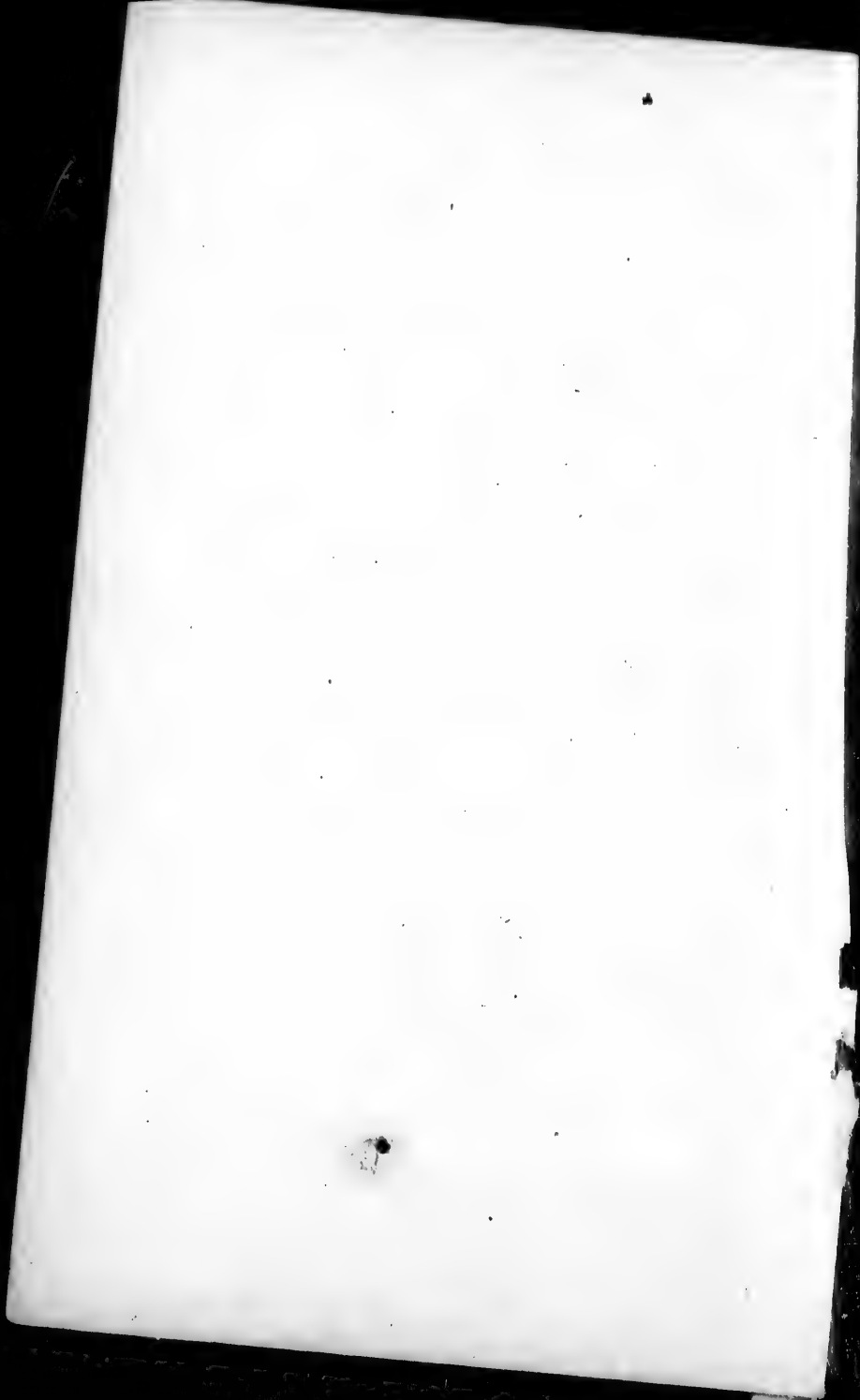
NOTE In addition to these we publish all the Supreme Court, Small Debt Court, and many special Mining Forms. These forms have all been carefully prepared and may be relied on as correct and in accordance with the Statute. See that each form has our imprint in the corner.

Thomson Stationery Co., Ltd.,

VANCOUVER, B. C.

AND CALGARY, ALTA.





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—AND—
MINERS' SUPPLIES
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Miners' Glasses—Coddington Magnifying Glasses, six sizes, from \$1.20 to \$2.50. This is one of the strongest and best makes of glasses made. We have also a large line at from 35 cents upwards.

Compasses—Pocket size, from the cheapest to the finest jeweled glasses, from 25c. to \$3.00.

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Engineer's Tapes—We always have a full stock of these and having the agency for Justus Roe's celebrated Steel Tapes.

Gold Dust Bags—At 25c., 35c. and 50c. Gold Dust and Money Belts, to be worn next the body, a large range.

Purses—Pocket Books, Wallets, all kinds, styles and sizes, from the cheapest to the finest.

Memorandum Books—Diaries in all sizes, from the vest pocket midget to the largest, and in all grades of bindings.

The Alaska Thermometer—Is a small but reliable self registering thermometer to 85° below zero, in a flat tin case.

The Klondike Thermometer---Also self registering, to 85° below zero, is packed in a hard rubber case, and in its case is about the size of a fountain pen or lead pencil.

Eye Protectors---In the celluloid, or goggles in wire frame and glass, white or colored, useful in protecting the eyes from dust and from snow blindness.

Postage Stamp Cases---In Tin and Leather with parchment sheets for keeping stamps from sticking.

Fountain Pens---The Parker, Waterman and other standard makes, a very large range, also the cheaper kinds at 40c. and upwards.

Ink Powders---We put up a very fine Ink Powder in Black or Red, to make $\frac{1}{2}$ pint good ink, 15c.

Ink Stands---Pocket size, in wood and rubber.

Gold Scales---Finely finished Brass Scales, weights from 1 gr. to 2 oz., \$2.00; 1 gr. to 4 oz., \$2.50.

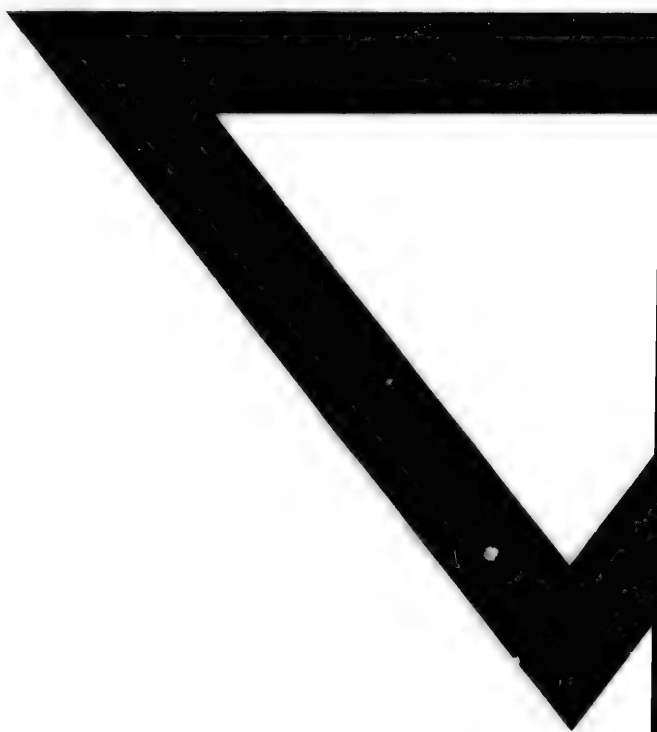
Pocket Match Safes---Pocket Combs, Minors, Pocket Knives, Books, etc.

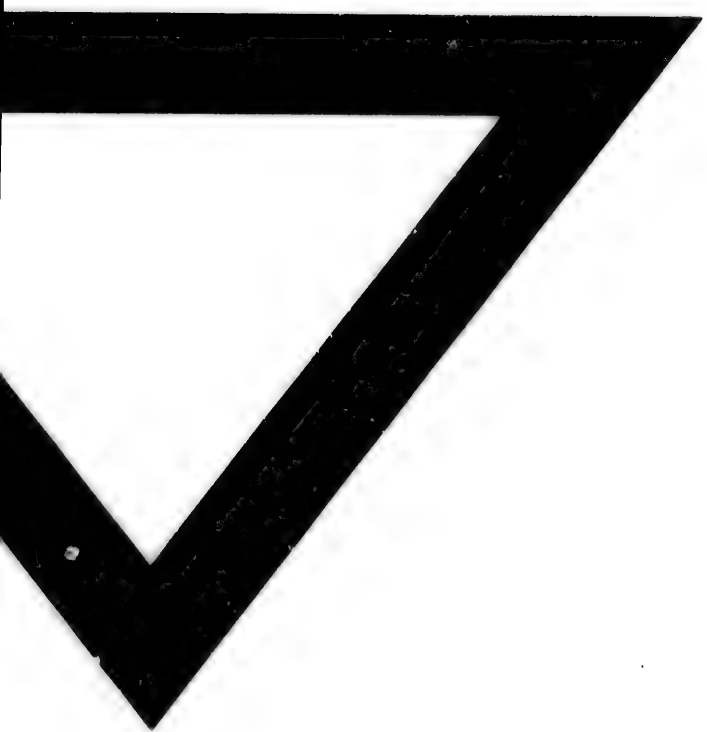
Thomson Stationery Co., Ltd.,

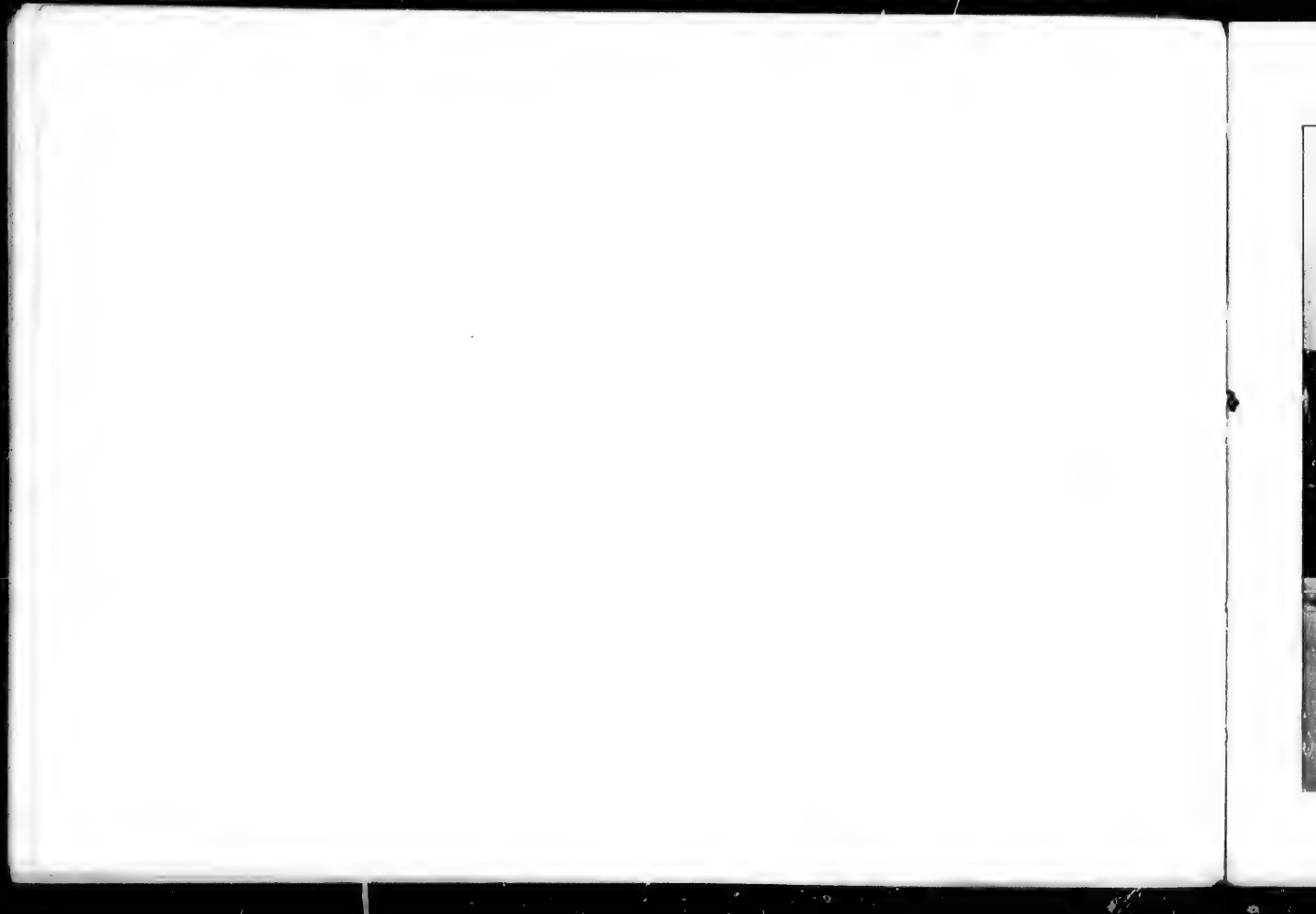
VANCOUVER, B. C.



FRITS FISHERY. Showing a white man's method of drying fish.

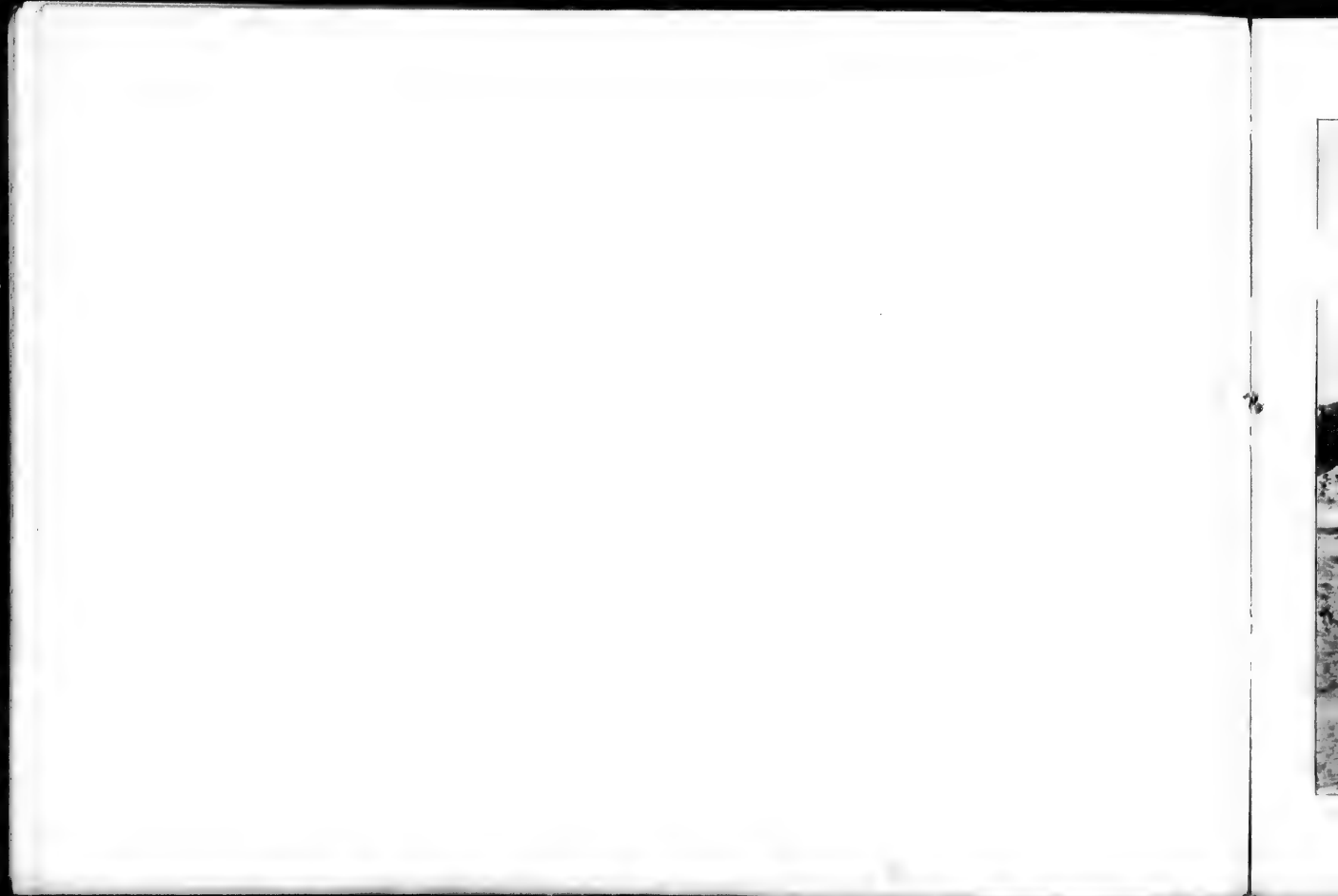






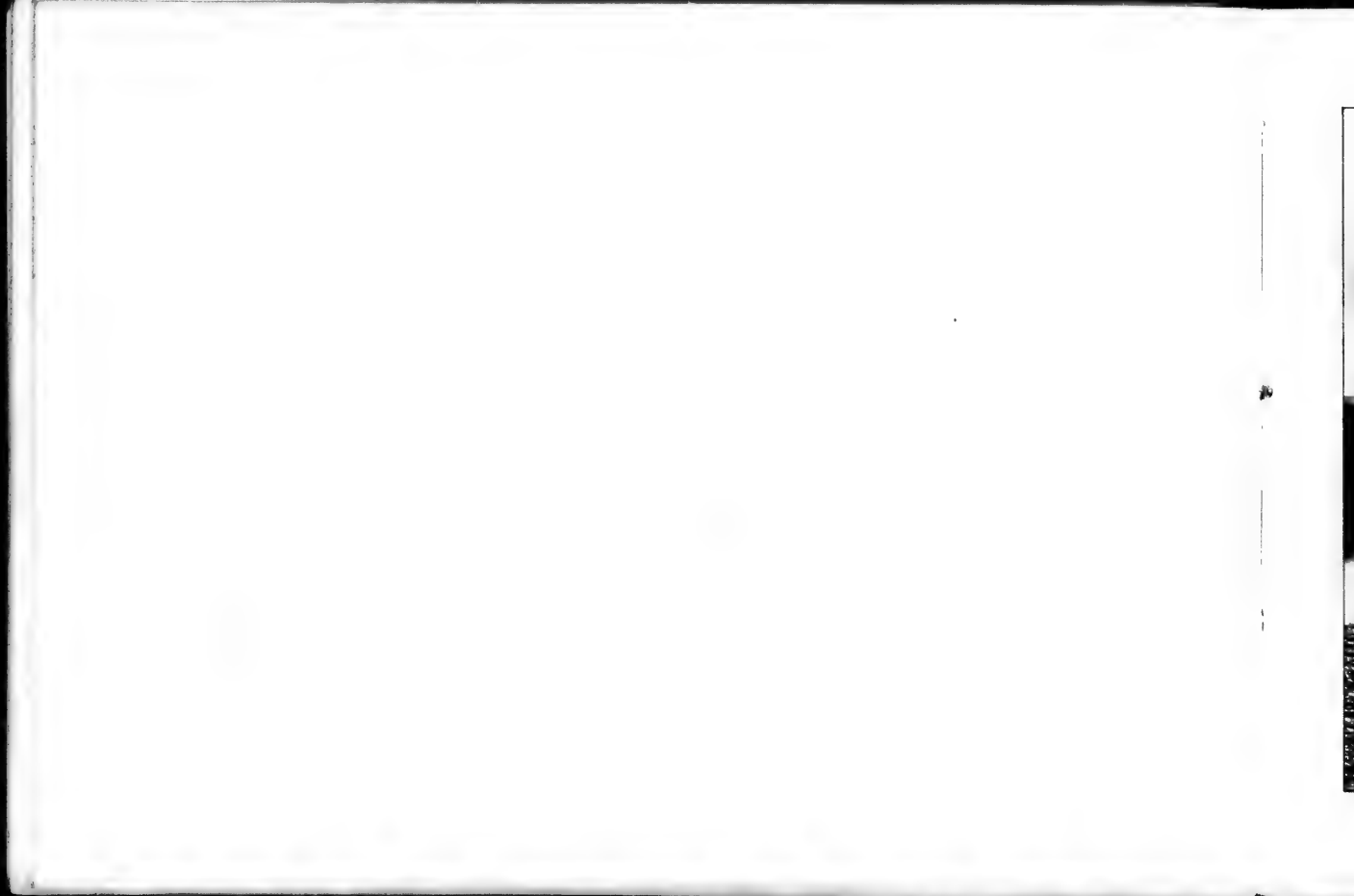


FORTY-MILE POST. So called from being forty miles below Fort Reliance. It is situated on a point of land formed by Forty-Mile Creek and the Yukon River.





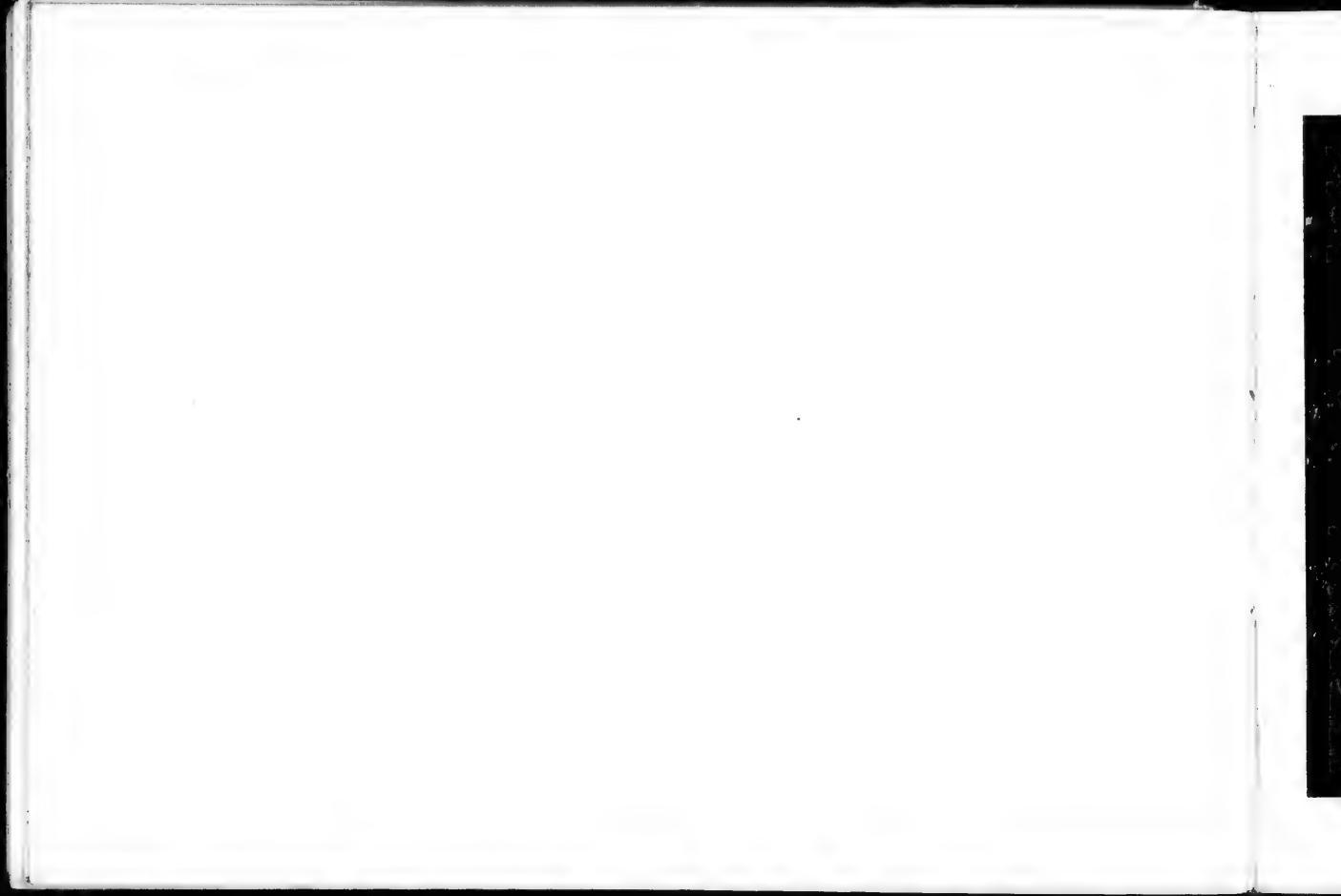
FORTY-MILE POST FROM THE YUKON. The buildings here are all of logs chinked with moss.
The roofs are of poles covered with a layer of dirt.





50, COPYRIGHT 1894 BY VERA ZIE WILSON.

FORTY-MILE POST FROM ACROSS THE CREEK. Forty-Mile is the principal settlement on the Canadian side, but is now about deserted for the Klondike.





BUSTER, A GENUINE ESQUIMAUX DOG.



BELLER, A HALF-BREED. Father a white man, mother a squaw.

ALL COPYRIGHT 1912, BY VESPER WILSON



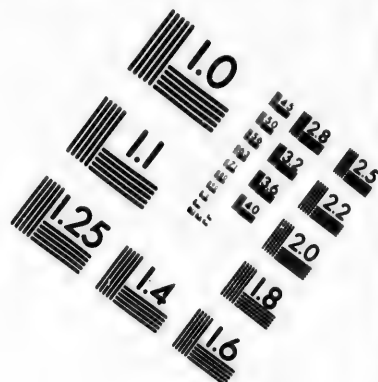
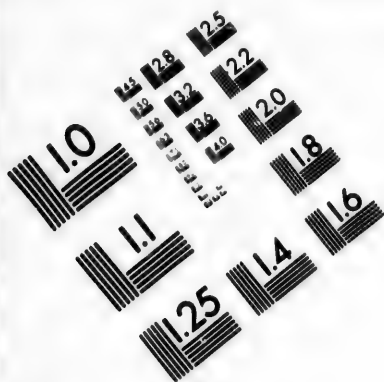
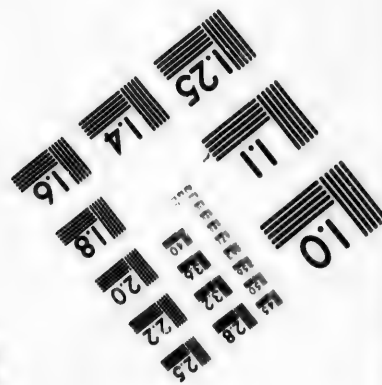
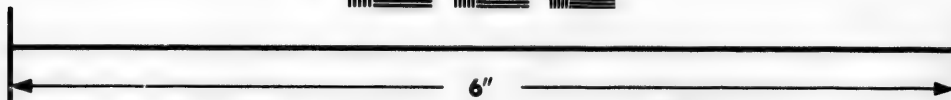
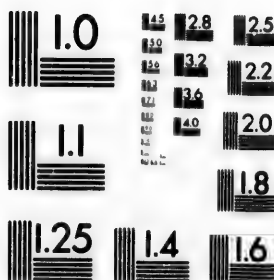


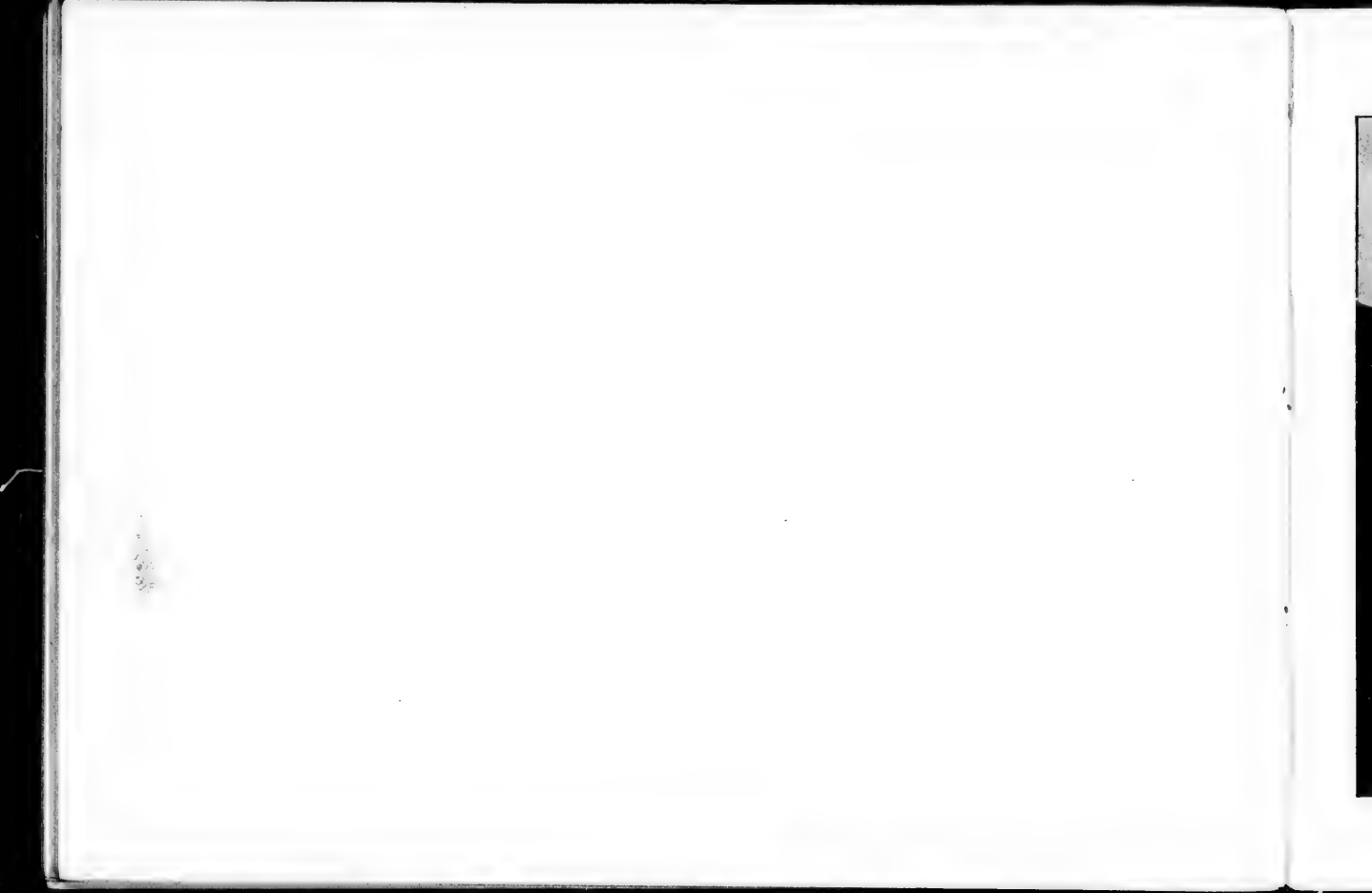
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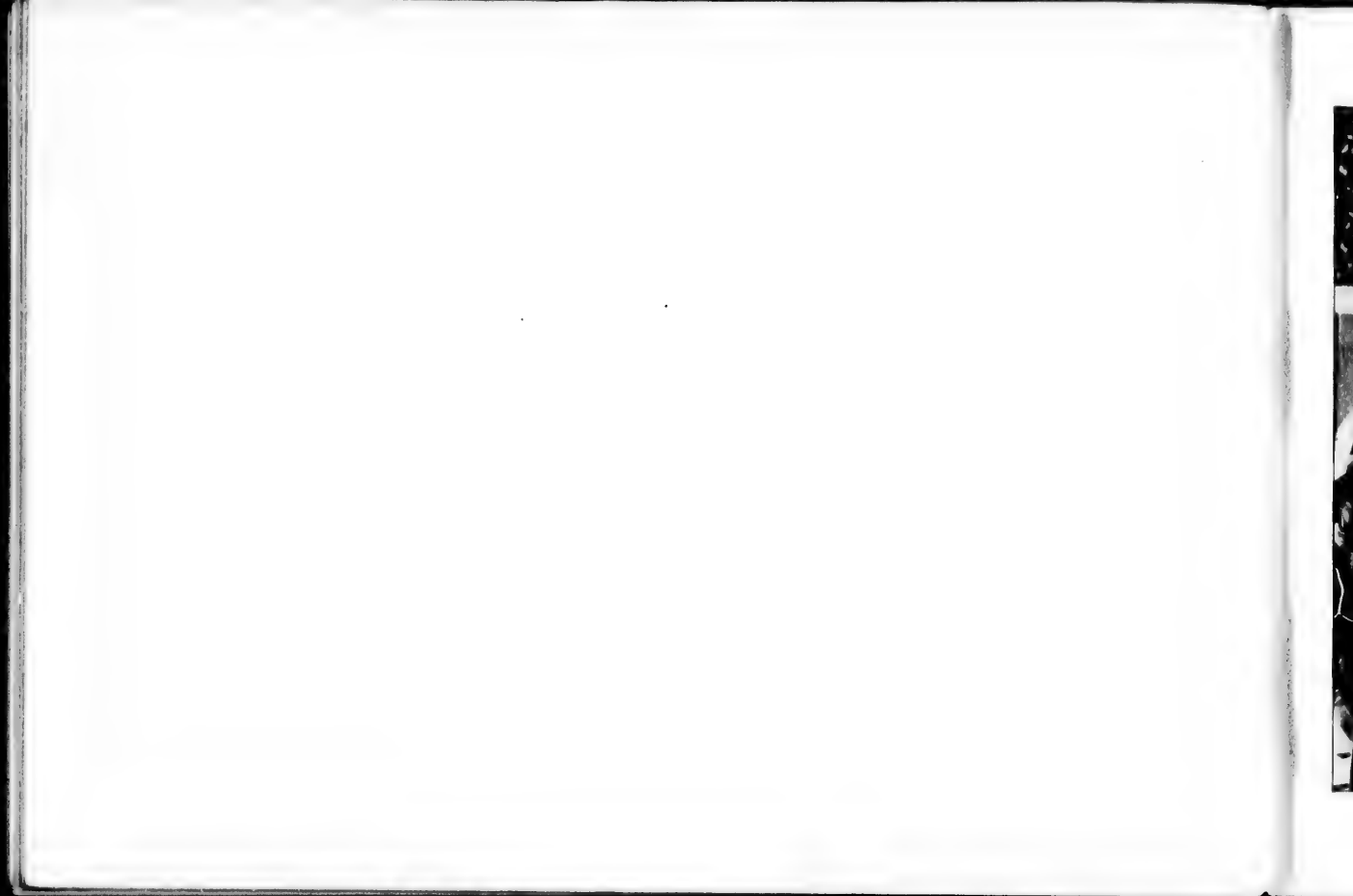




STEAMER ARCTIC bringing the first mail and provisions in the early spring.



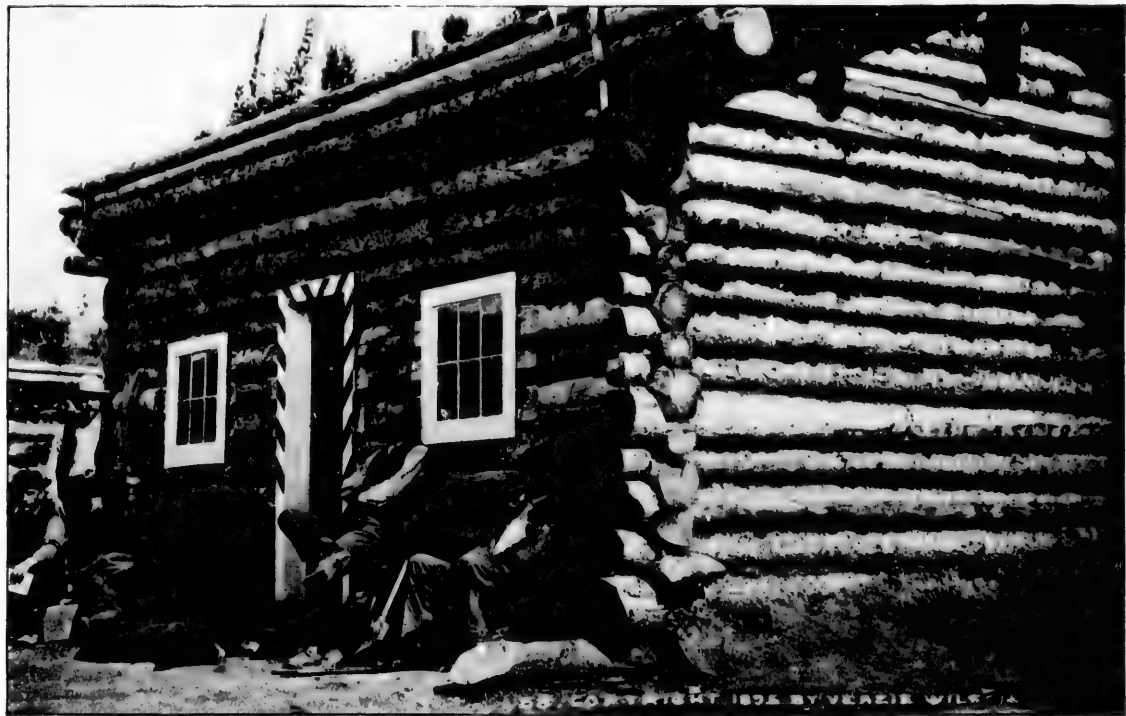
THEATRE AT FORTY-MILE. Actors on the porch. \$1,000 was the cost of building this theatre, but it sold for \$5,000. Here they played a piece called "The Man from Douglass Island."





INTERIOR OF SALOON AND POKER GAME AT FORTY-MILE. In this game \$10,000 often changes hands in one jack-pot. Drinks are fifty cents and one dollar.



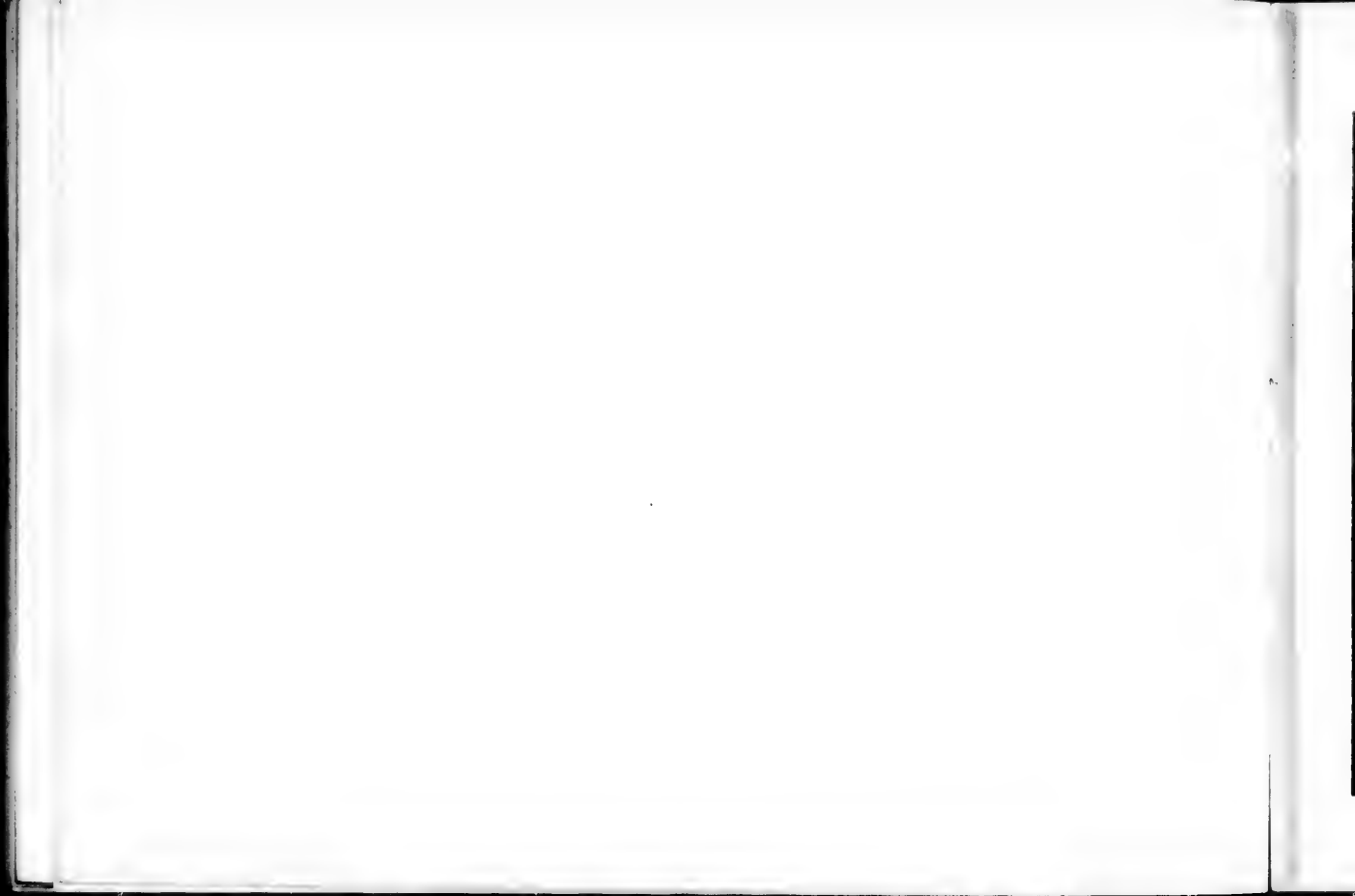


BARBER SHOP AT FORTY-MILE. Very few men wear beards or mustaches in winter. When the temperature is forty below zero the breath freezes, and the hair on one's face becomes a mass of ice.





EXTERIOR OF SALOON AT FORTY-MILE, showing the first horse brought into Forty-Mile.



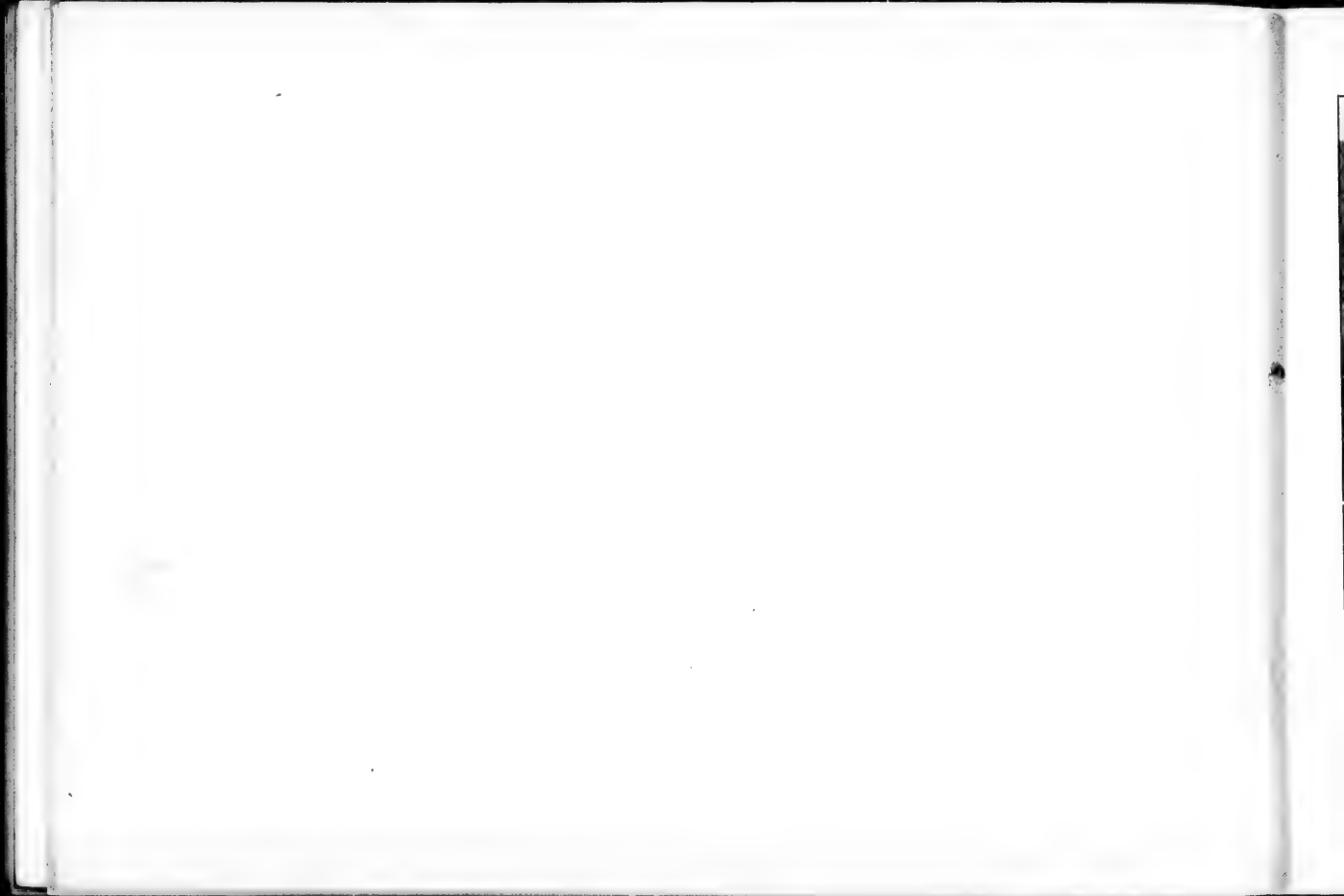


GROUP OF MEN IN NATIVE WINTER DRESS AND PARKAS. The upper garment, called a parka, is usually made of marmot skins and trimmed with wolverine around the hood and lower edge.



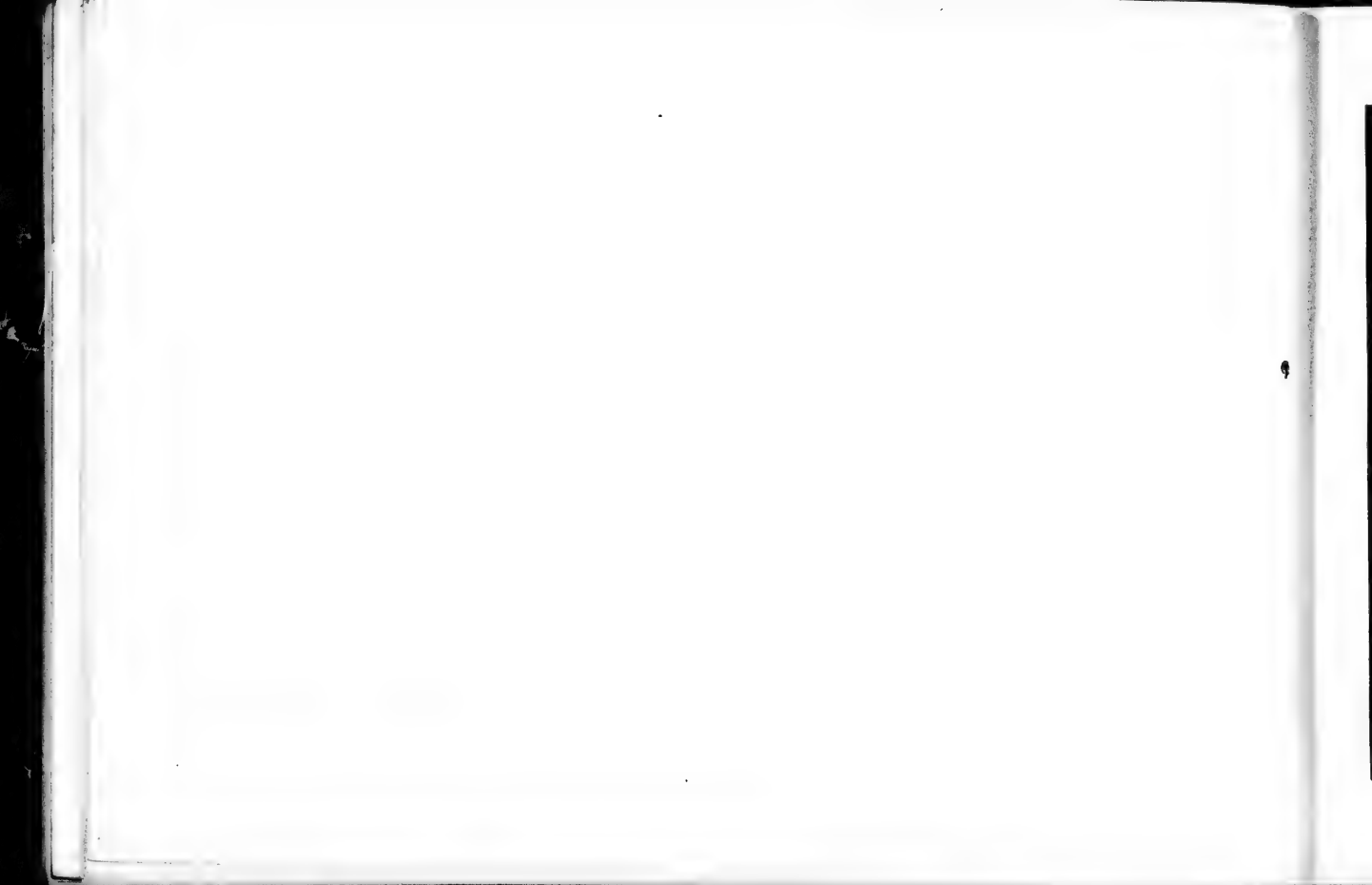


YOUNG MOOSE AT FORTY-MILE. These moose were trained by Mr. McQuesten to become commendable and well behaved draft animals.





GROUP OF FORTY-MILE MINERS. One hundred thousand men could prospect the Yukon basin and be lost to one another. The greatest drawback is the limit of supplies.

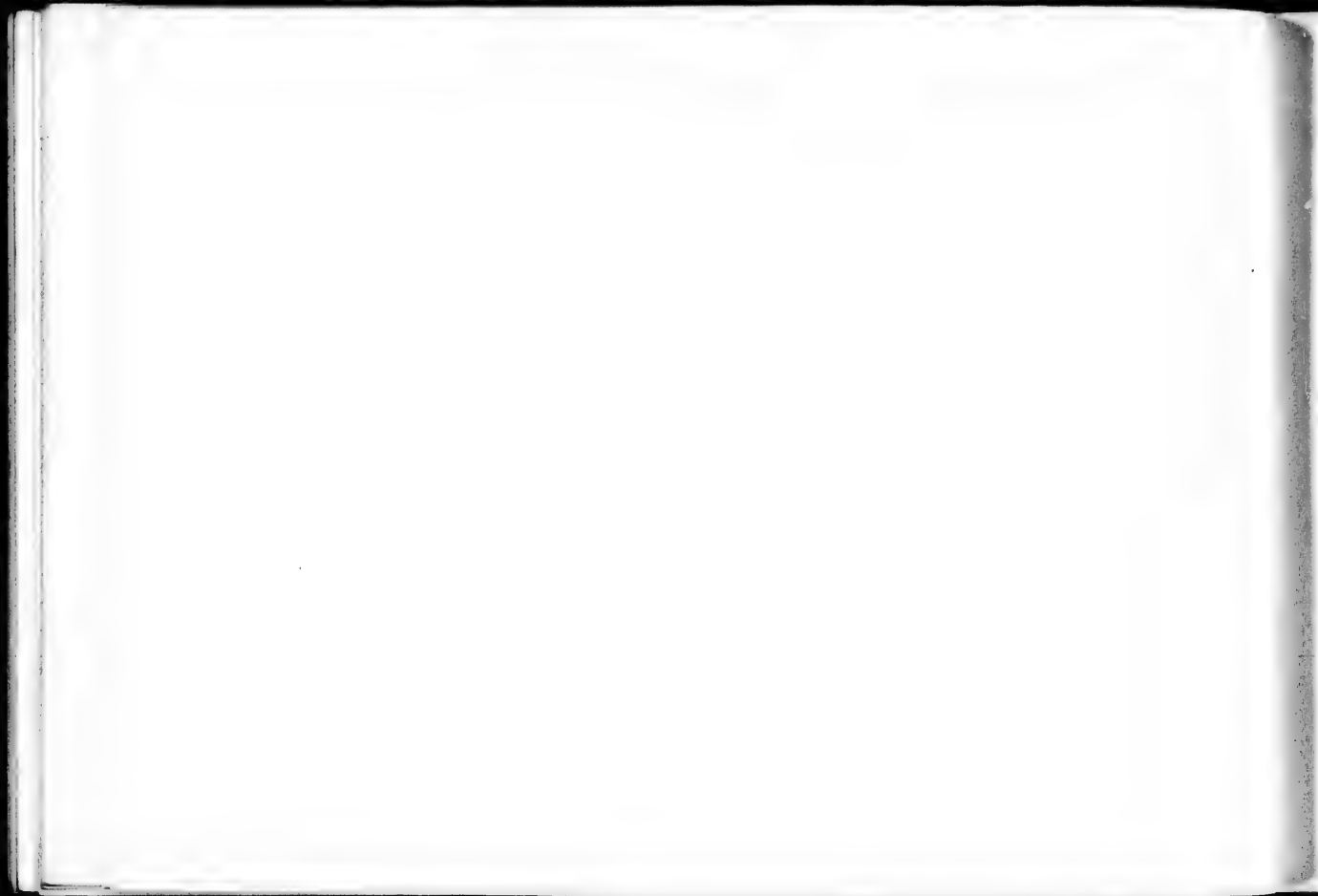




MR. WILSON AND HIS FRIEND IN WINTER DRESS. Some of these parkas come all the way from Siberia and are works of art, costing as high as \$100.



65. COPYRIGHT 1915 BY VEAZIE WILSON.
FORT CUDAHY WAREHOUSES. Just below where Forty-Mile Creek unites with the Yukon, on a beautiful wooded shelf, high above the river, protected from north and west winds by high hills, rests Fort Cudahy.





69.
COPYRIGHT 1895 BY
VEAZIE WILSON

MRS. HEALY'S DINING ROOM AT FORTY-MILE, showing that homes can be made and luxuries enjoyed even in this far and frozen North.



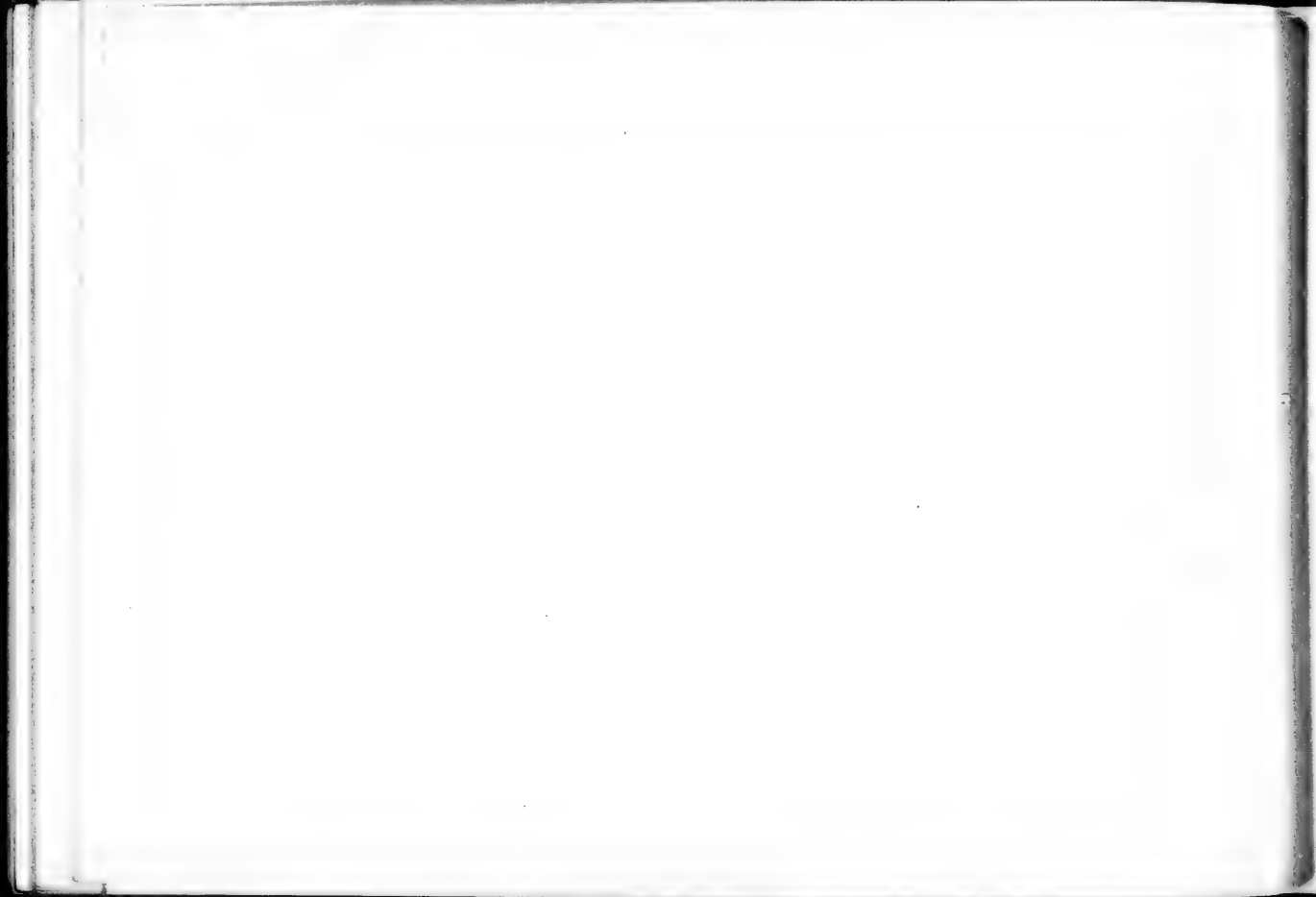


TO. CO. RIGHT 1895 BY VRAZIE WILSON

FIRST SUPPLIES LANDING AT CIRCLE CITY, SEPTEMBER 5, 1894.

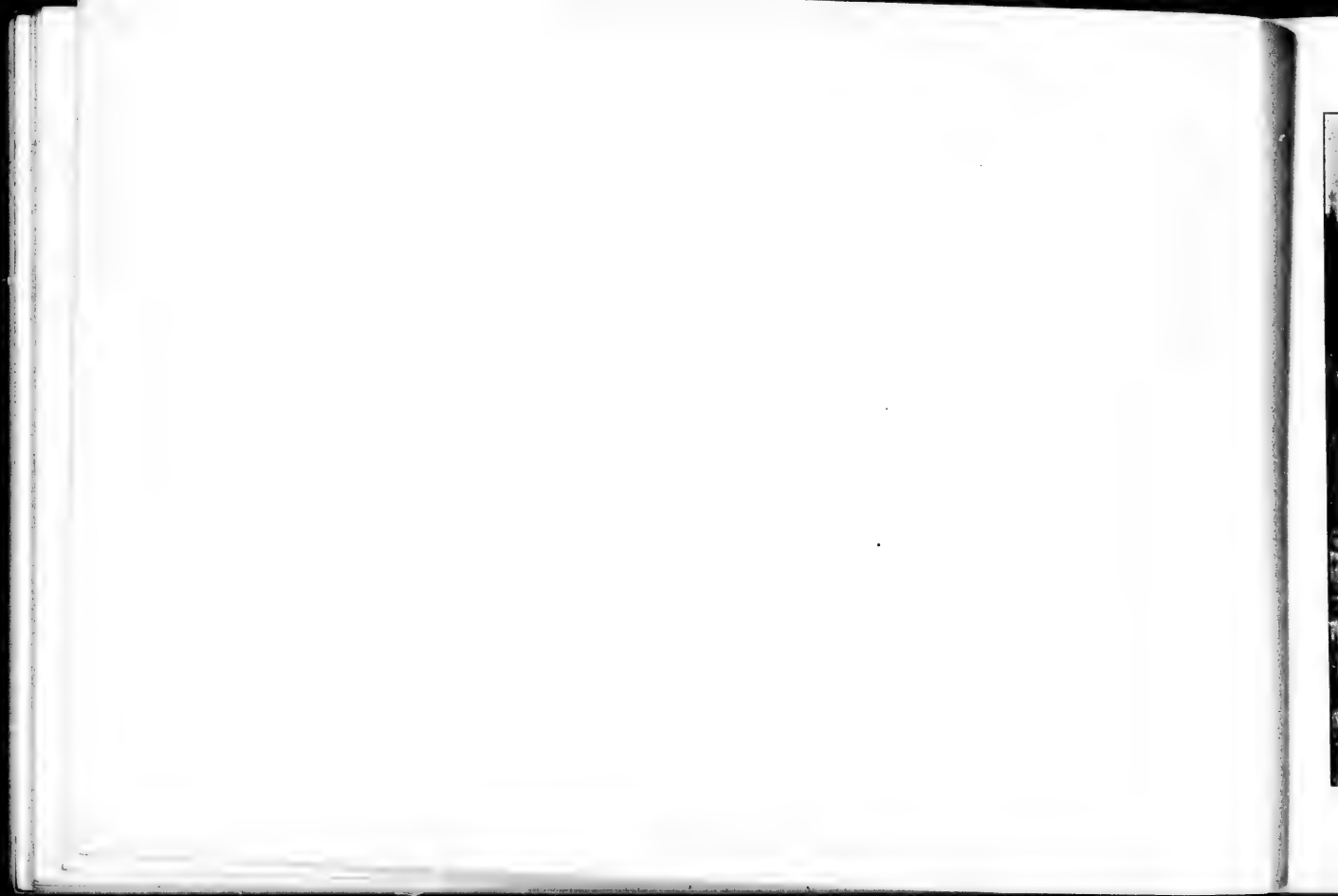


FOUNDING OF CIRCLE CITY. This is on American soil and bids fair to become the metropolis of the Yukon.
It is one hundred and seventy miles from Forty-Mile Creek, on the west of the river.



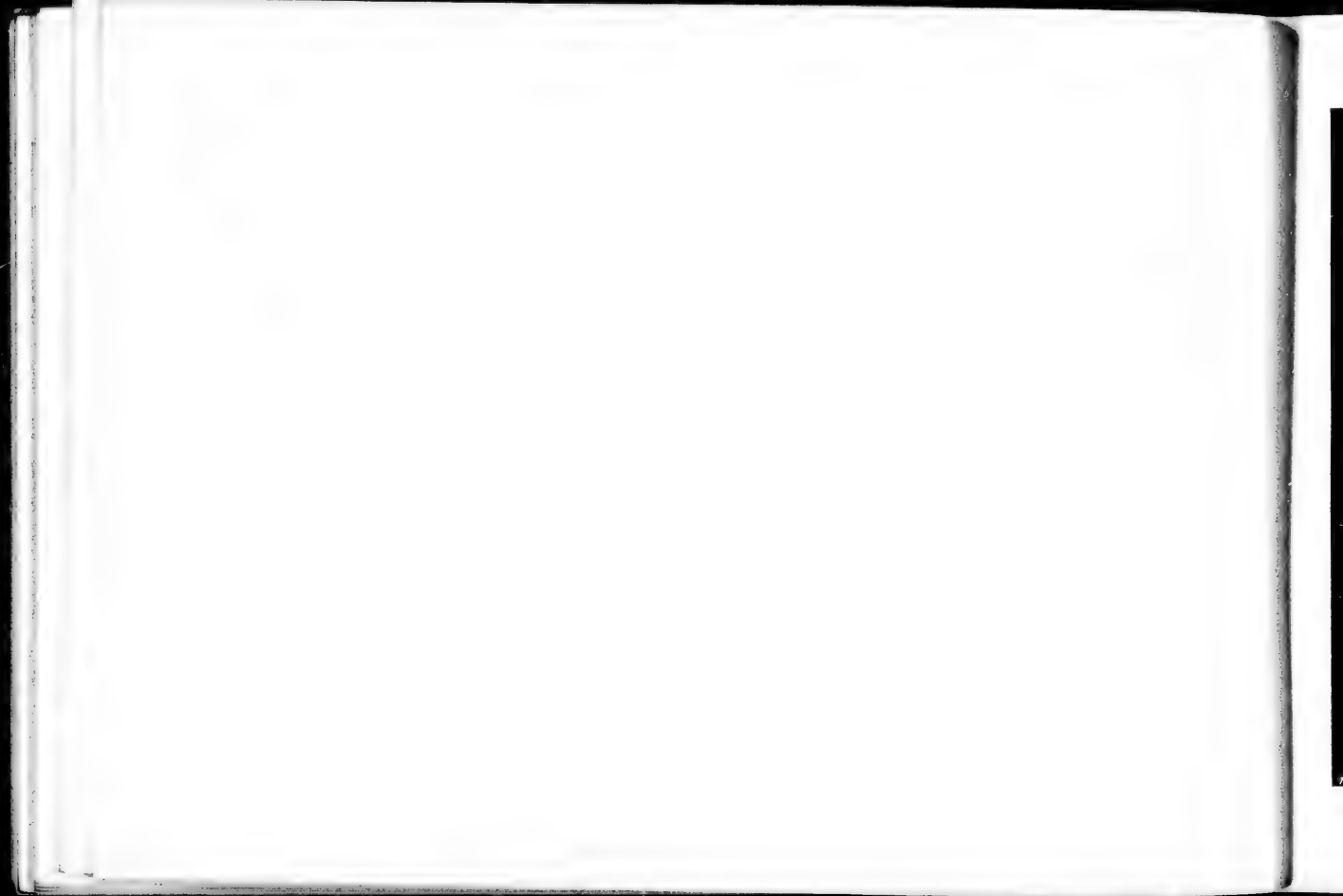


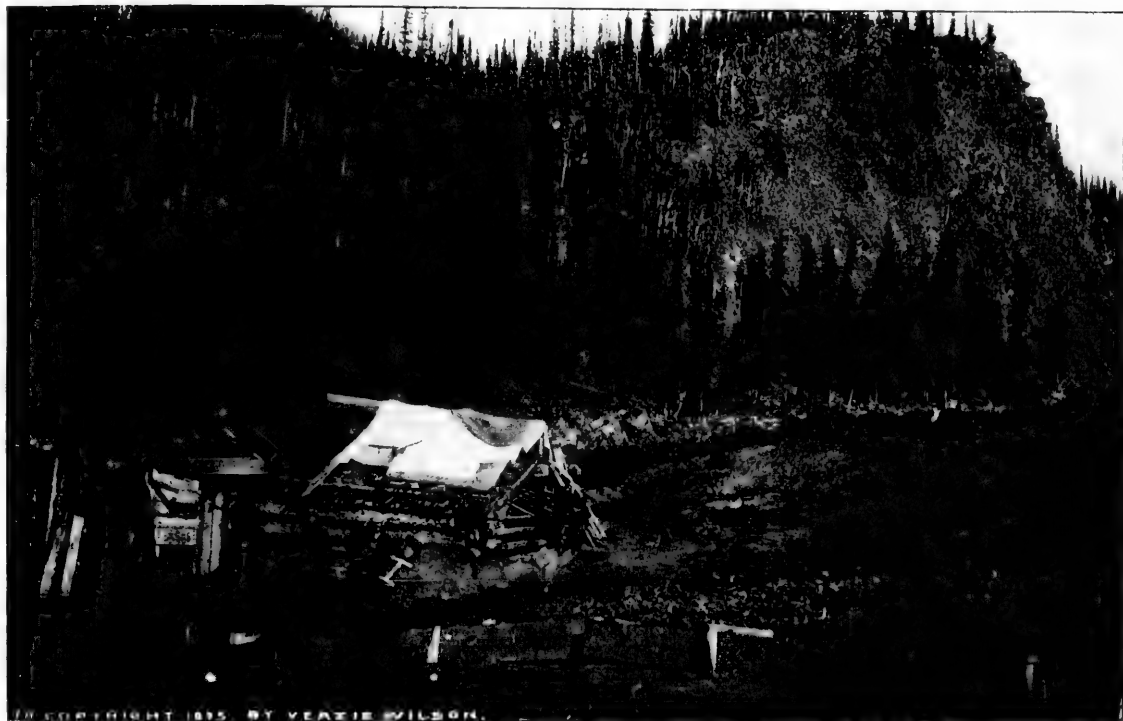
CANYON ON FORTY-MILE CREEK, eight miles up the creek; it is a crooked contraction of the river.



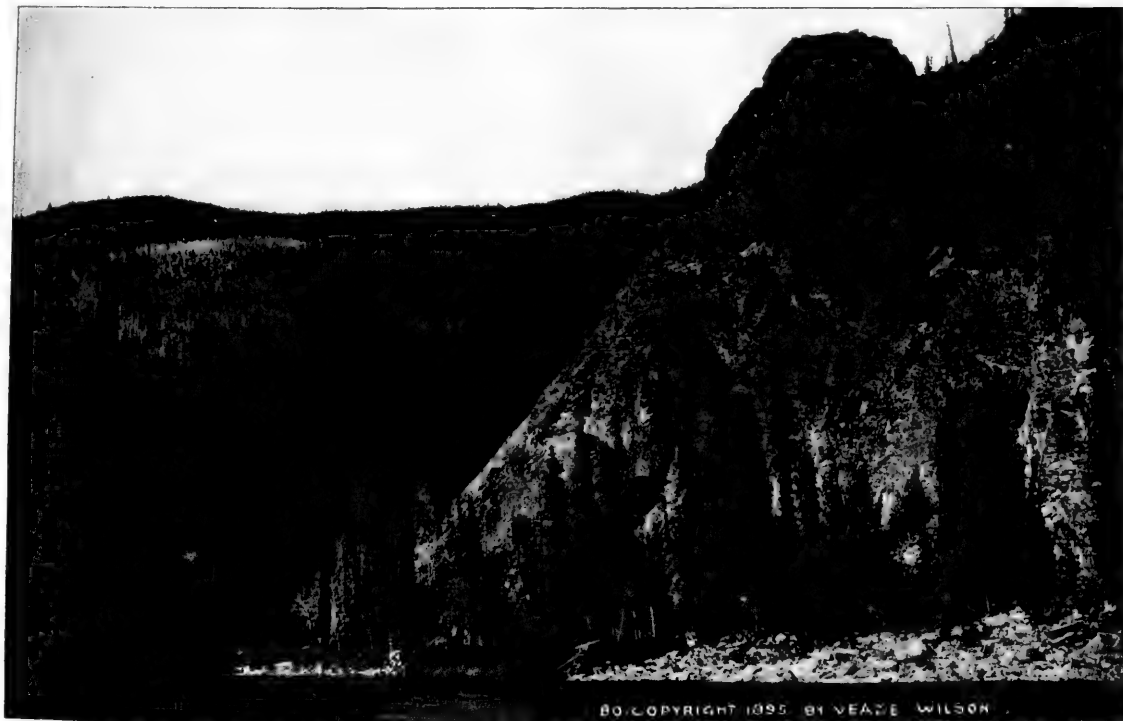


TOWING A BOAT THROUGH FORTY-MILE CANYON. At the lower end of the canyon there is a short turn and swift water and some large rocks. These can not generally be seen, and there is much danger.





SAM PATCH'S POTATO RANCH. The only man to raise potatoes on the Yukon.
They sell for \$1.00 per pound.

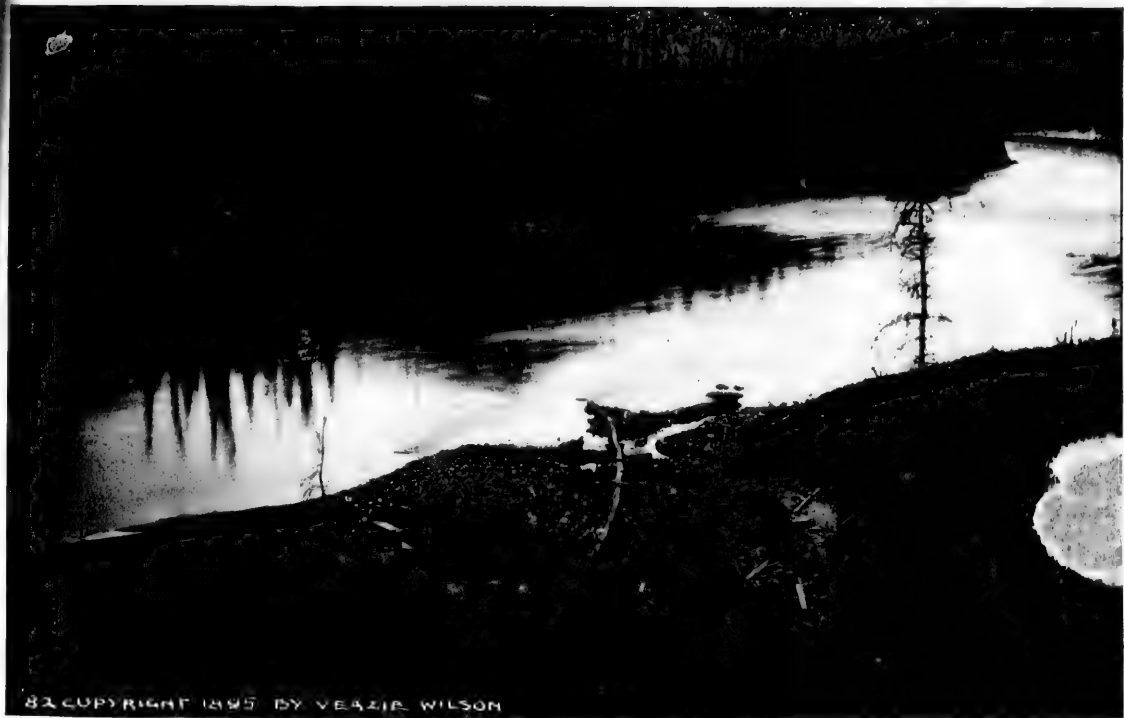


SCENE ON FORTY-MILE CREEK. Forty-Mile Creek is two hundred and fifty yards long. It has many tributaries, all of which carry gold in paying quantities. This country is nearly covered with a glacial drift.





81. COPYRIGHT 1895 BY VEAZIE WILSON
SCENE TAKEN FROM SAM PATCH'S SHOWING THE BALD HILLS. The glacial drift from these hills feeds
hundreds of tributaries to the larger creeks.



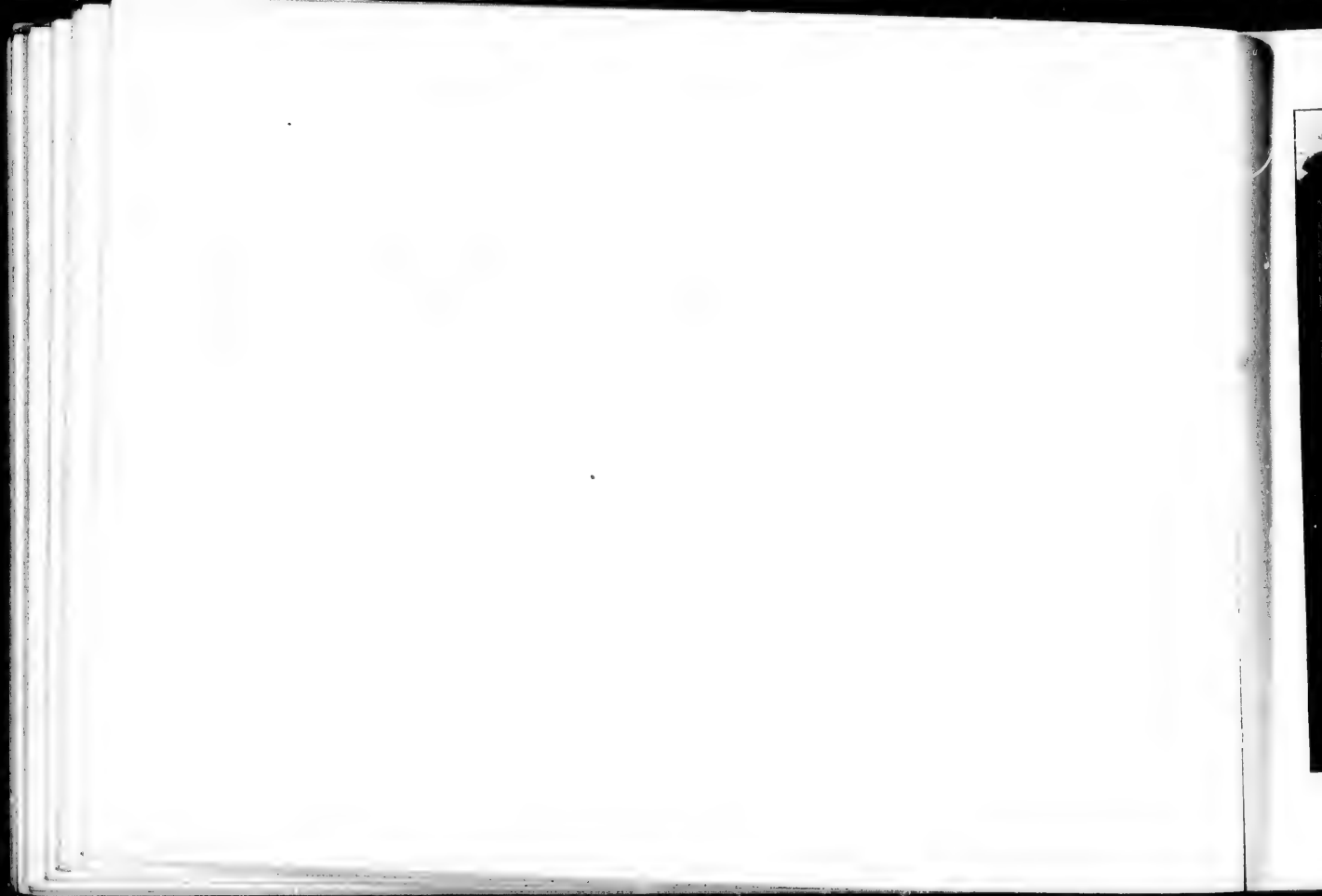
82 COPYRIGHT 1895 BY VEAZIE WILSON

MINE ON FORTY-MILE CREEK SHOWING MINERS' CABINS.





GROUP OF YUKON MINERS READY TO RETURN HOME. Waiting for the river steamer.
They nearly all have a stake, some a fabulous fortune.





DOG PACK TEAM ON SUMMIT OF BALD HILLS. The dogs here are closely related to the wolves and are nothing if not born thieves. They usually celebrate the arrival of all newcomers by a general fight.





CLAIM THREE ON MILLER CREEK. \$35,000 taken out; worked only thirty by one hundred feet, one clean-up being made of one thousand one hundred ounces.





86 COPYRIGHT 1895 BY VEAZIE WILSON.
MILLER CREEK FROM SUMMIT. Six miles long and has fifty-four rich claims. It was prospected and given up three times before it was found profitable. This shows the difficulty of prospecting, owing to the glacial drift everywhere.





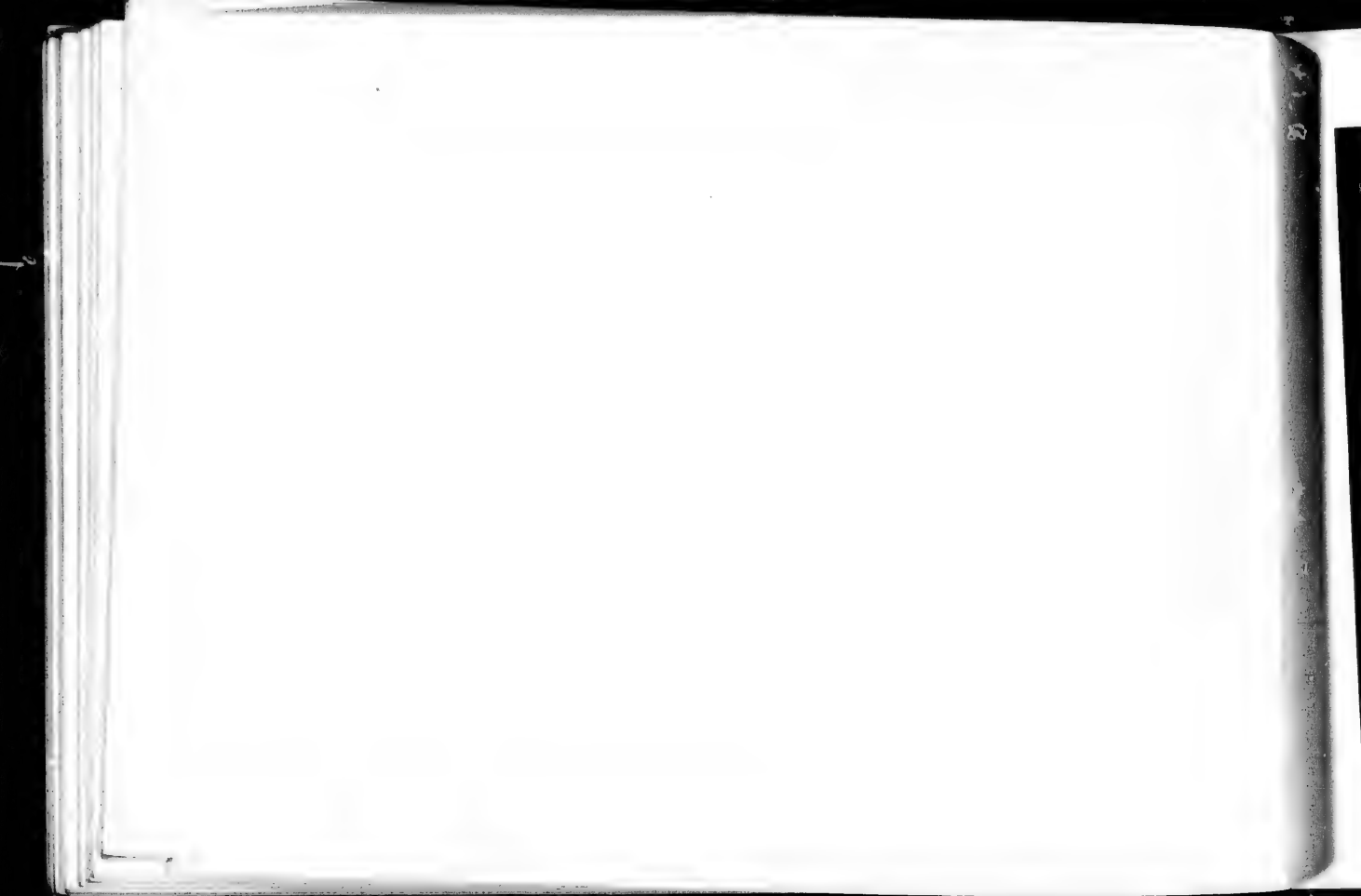
YOUNG AND BLANCHARD'S CLAIM AT MILLER CREEK. This shows the sluice boxes. This is a placer mine. Placer is a Spanish word and means, literally, pleasure, that is, plenty of metal easily mined.

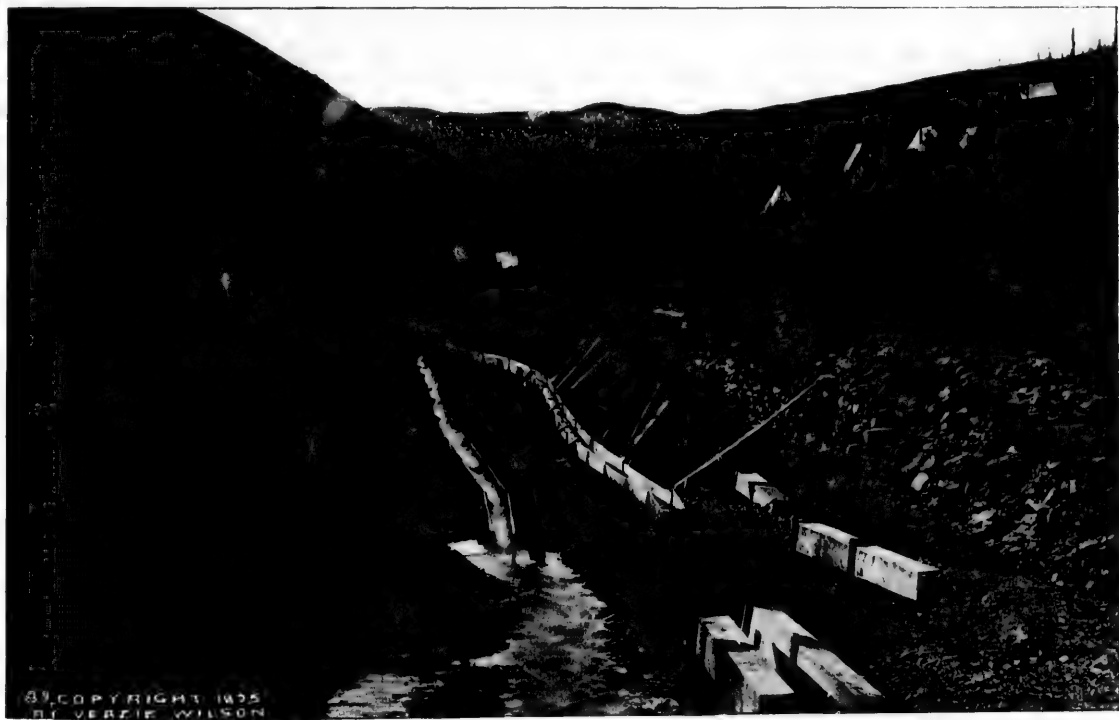




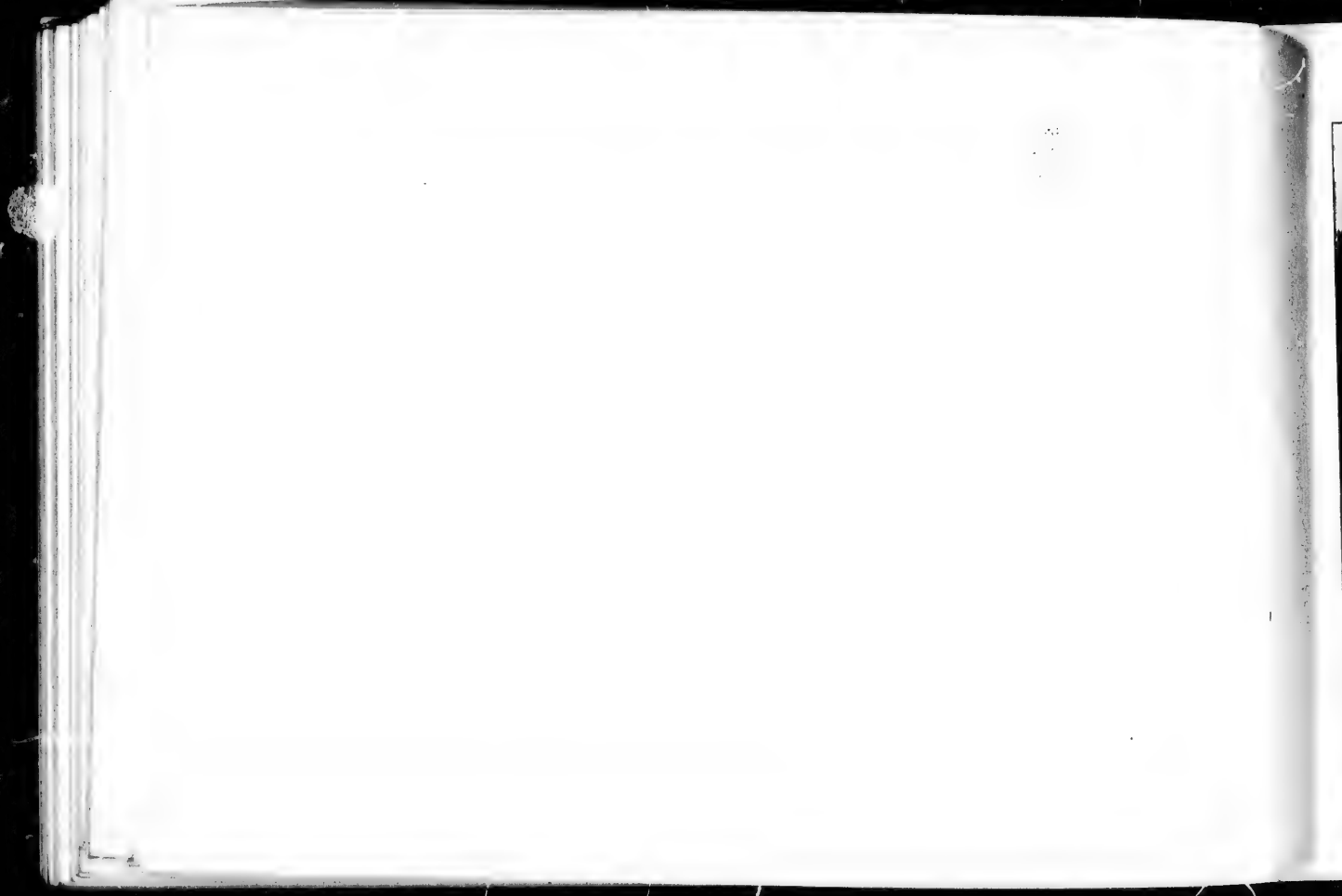
88: COPYRIGHT 1895 BY VEAZIE WILSON

YOUNG AND BLANCHARD'S CLAIM AT WORK. Placer gold is free gold, in dust, nuggets, scales, filaments, lumps; the gravel in which it lies is called pay dirt.



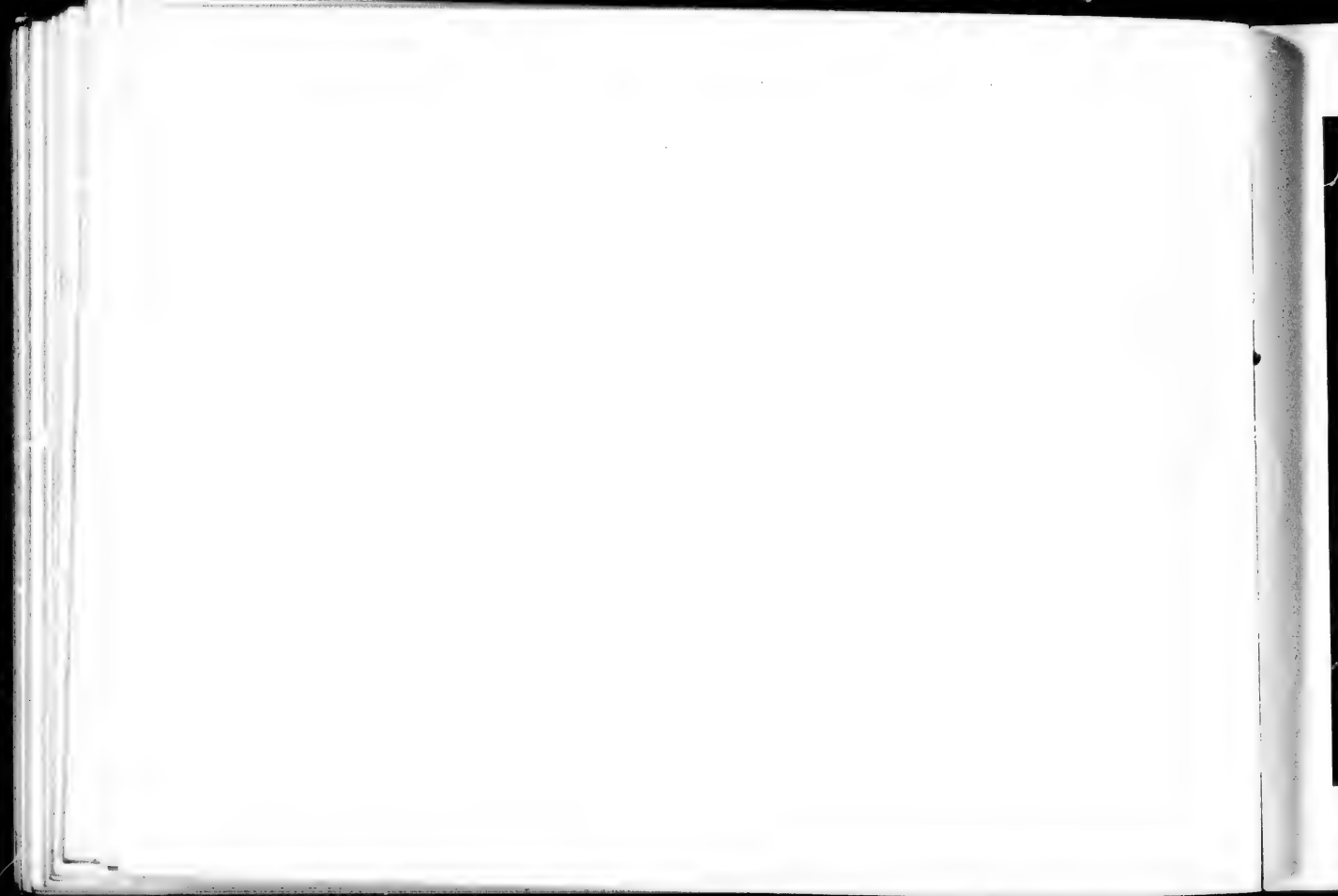


FRANK CROMIER'S CLAIM, MILLER CREEK. Placer gold came there by being ground by natural processes out of the quartz or other matrix where nature placed it, and deposited in a natural and unmixed state amid the washings of the hills.



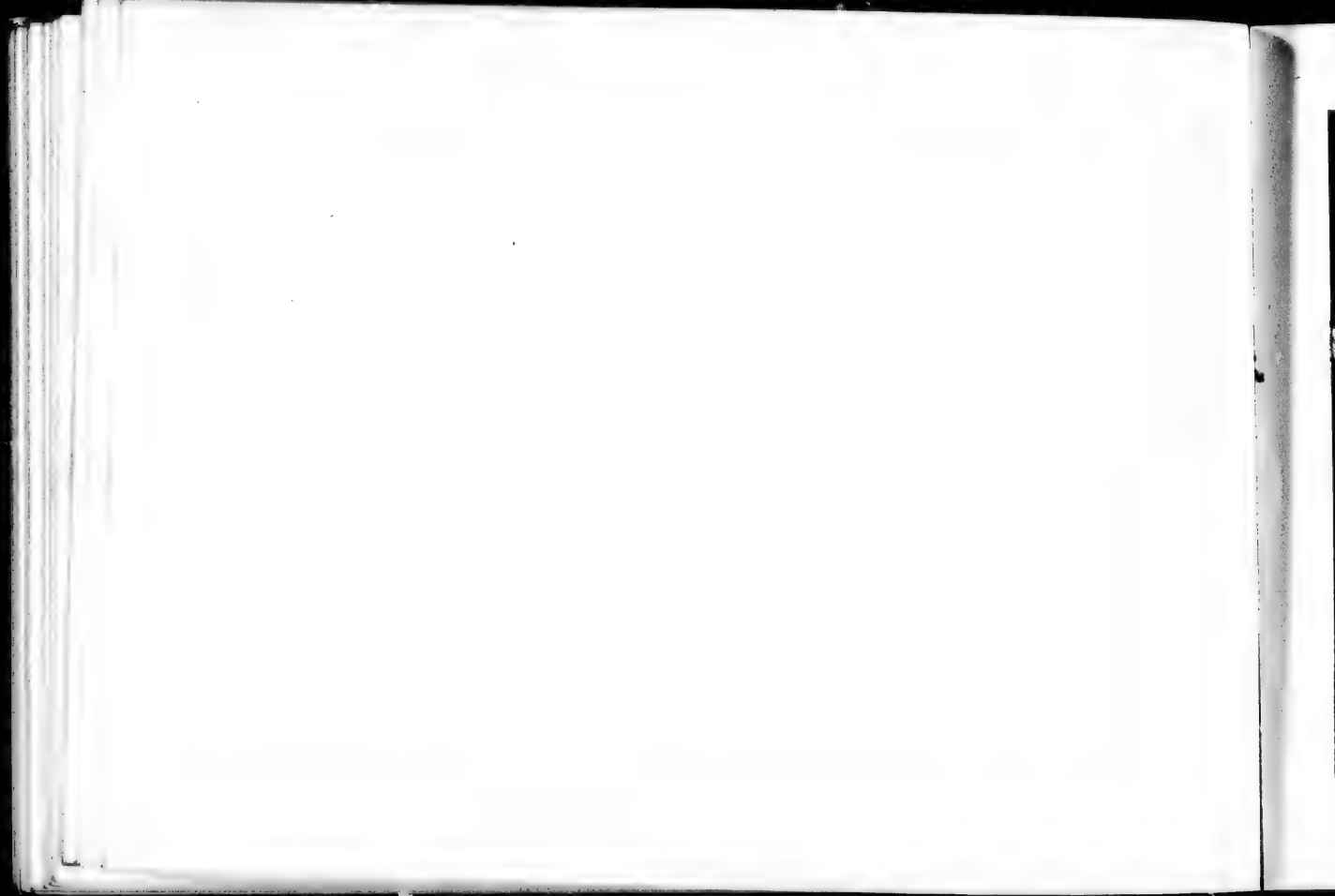


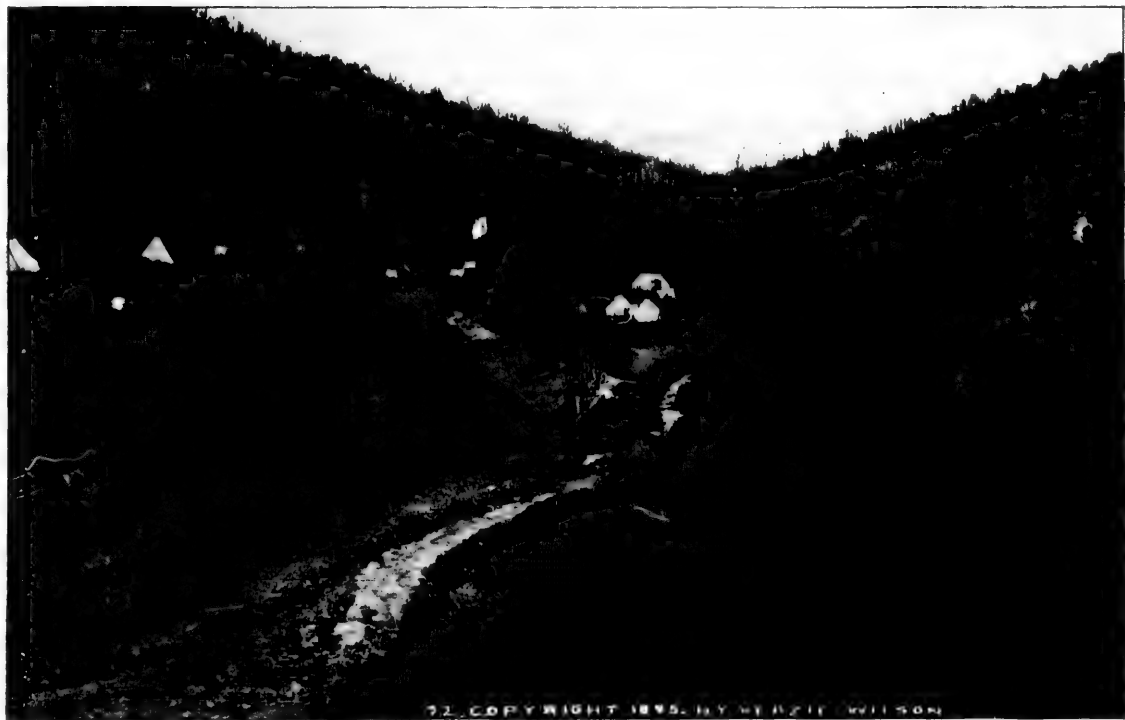
MILLER CREEK CAMP. From Forty-Mile Post to the head of Miller Creek is sixty-one miles. Dogs do all the freighting in winter to the mines, their food being dried salmon only. They sleep in the snow.



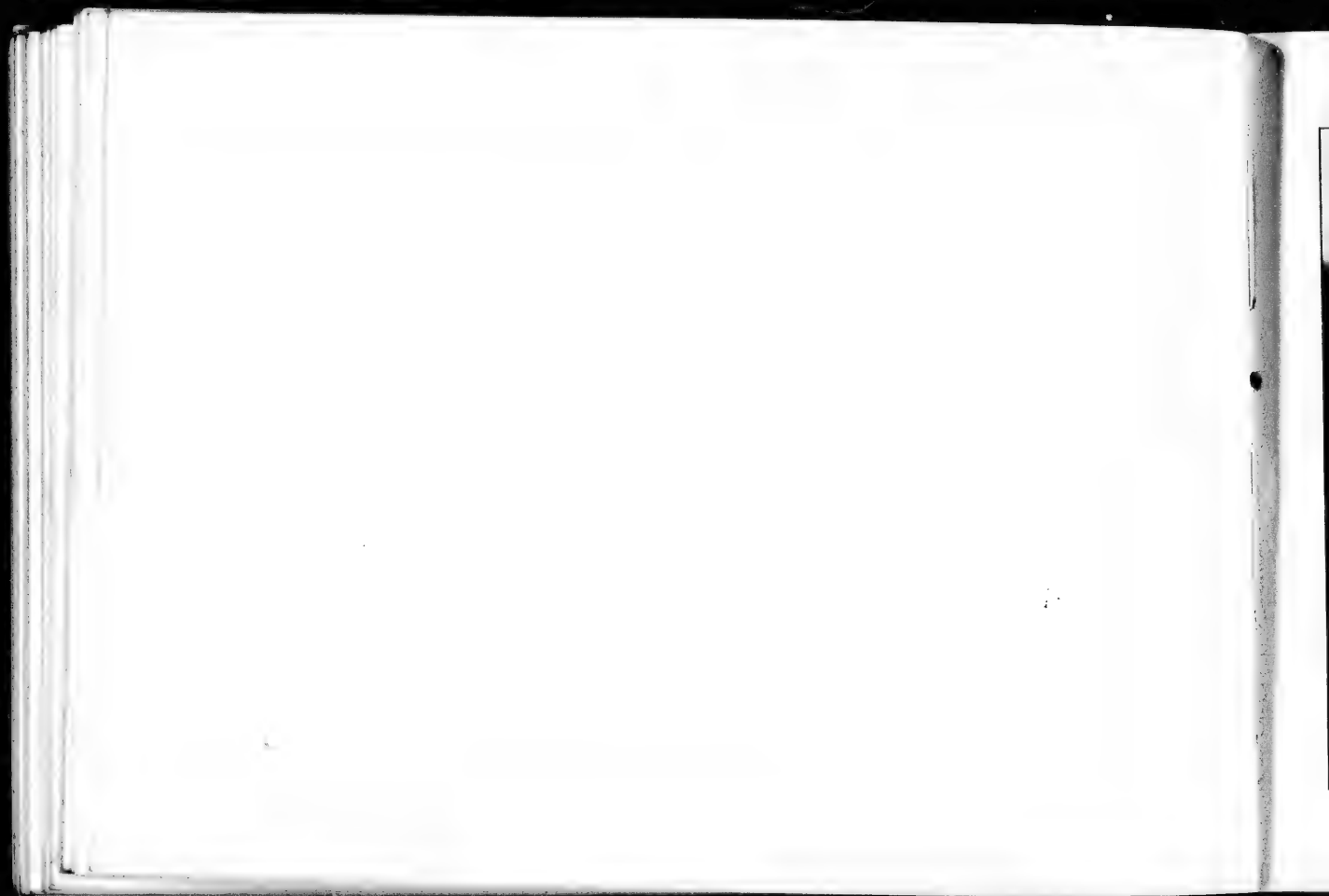


CLAIM FOUR ON MILLER CREEK. This shows the sluice, which is a long box with riffles. They are often joined in series and may extend several hundred feet.



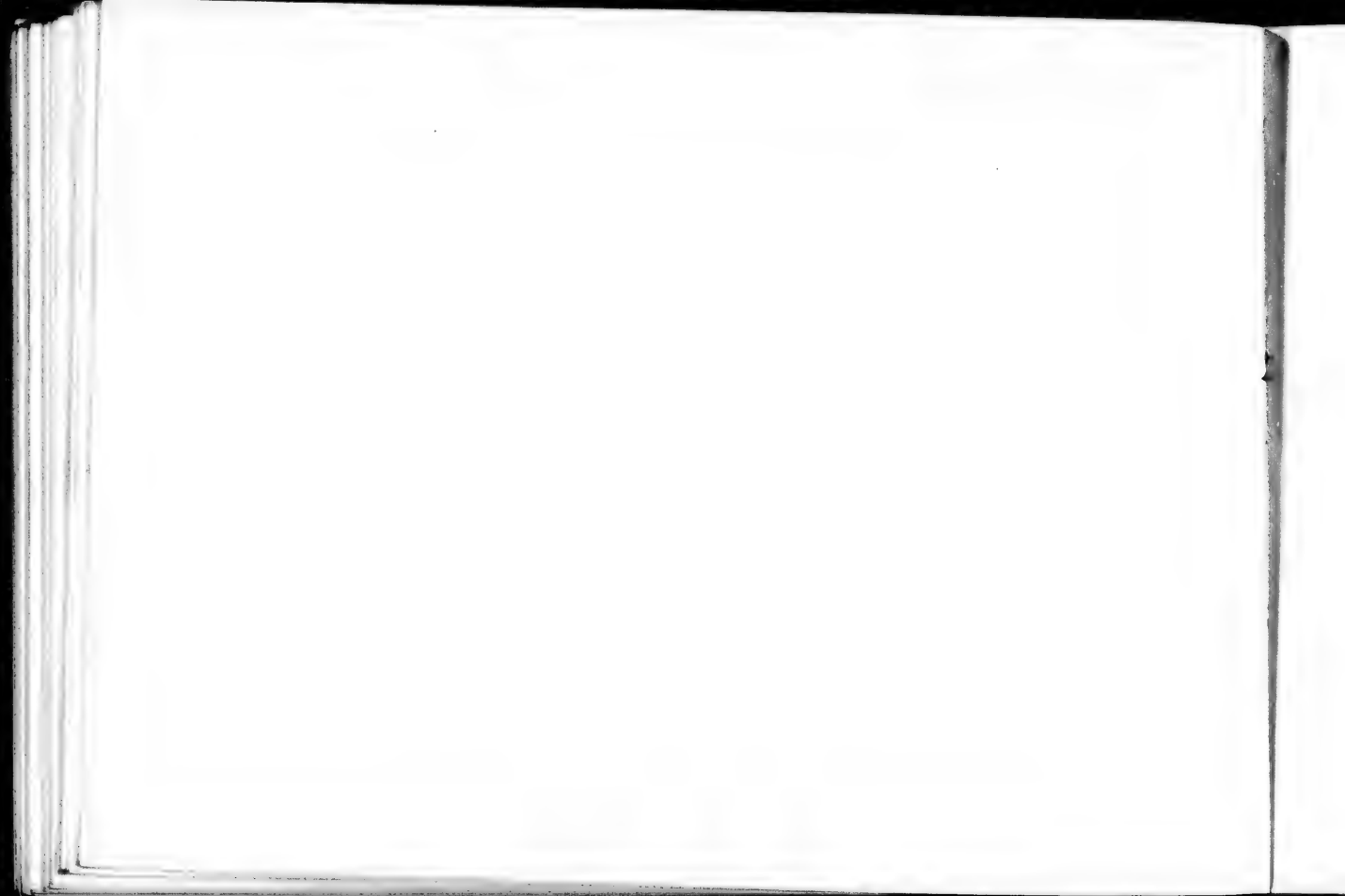


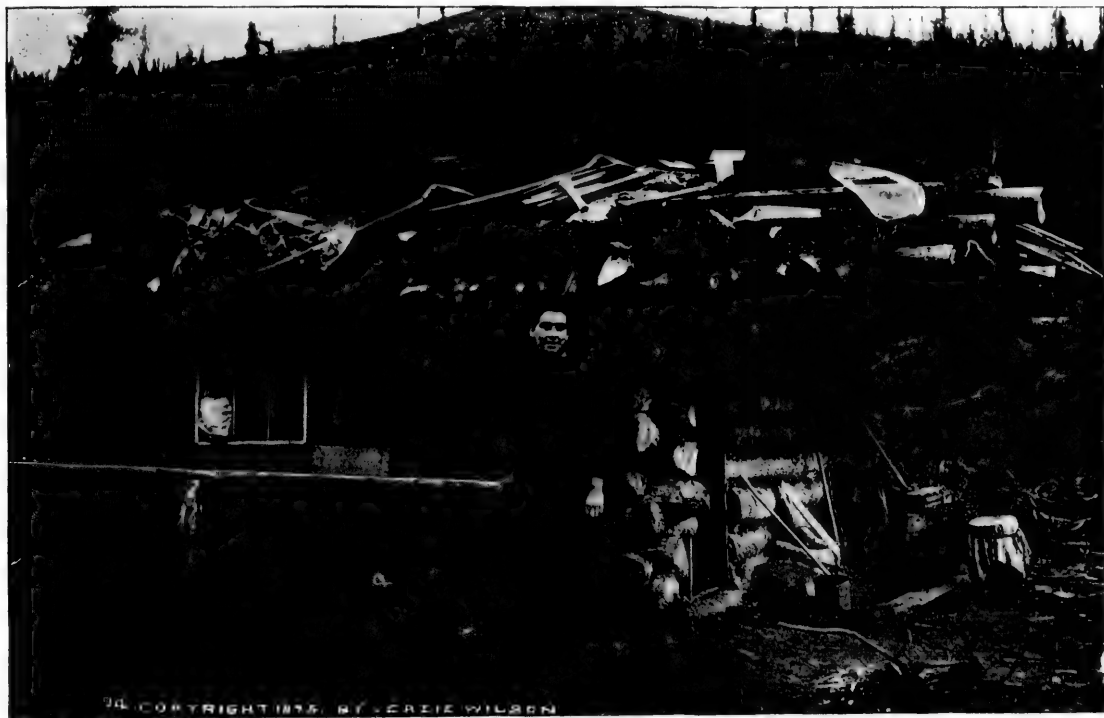
BARKER'S CLAIM. The sluice boxes are given a grade regulated by the quality of the gold, that is, if the gold is very fine the grade will be slight, but if of a coarser character a greater pitch will be given.



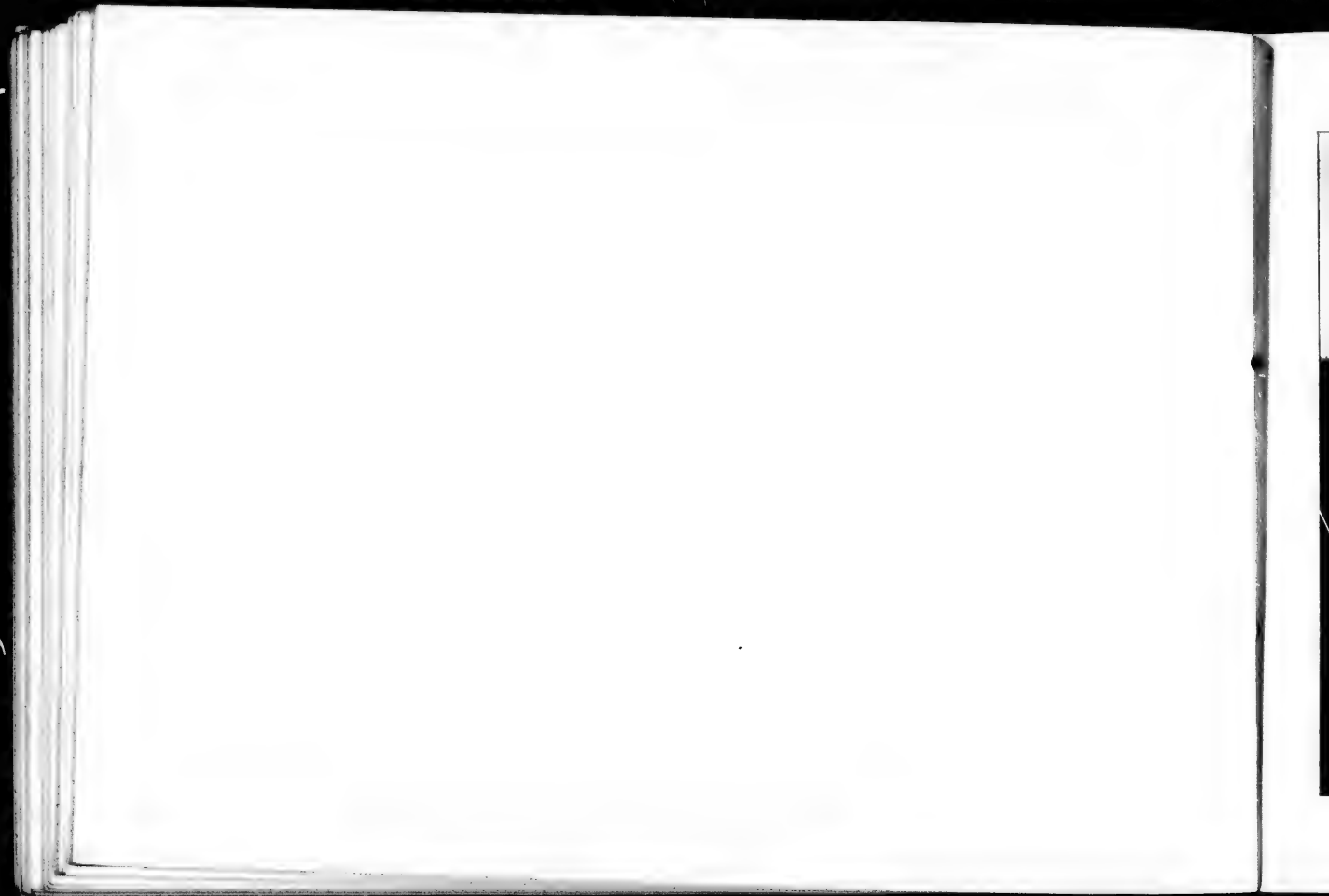


OPENING UP A CLAIM. The method of prospecting is usually carried on by sinking a number of holes to bed-rock across the bed of a creek, or cross cutting it by a tunnel and testing the dirt every few minutes.





FIRST WHITE WOMAN ON THE YUKON. Lives at Miller Creek. She is standing beside her home
She boasts of being able to prospect and mine as good as any man.





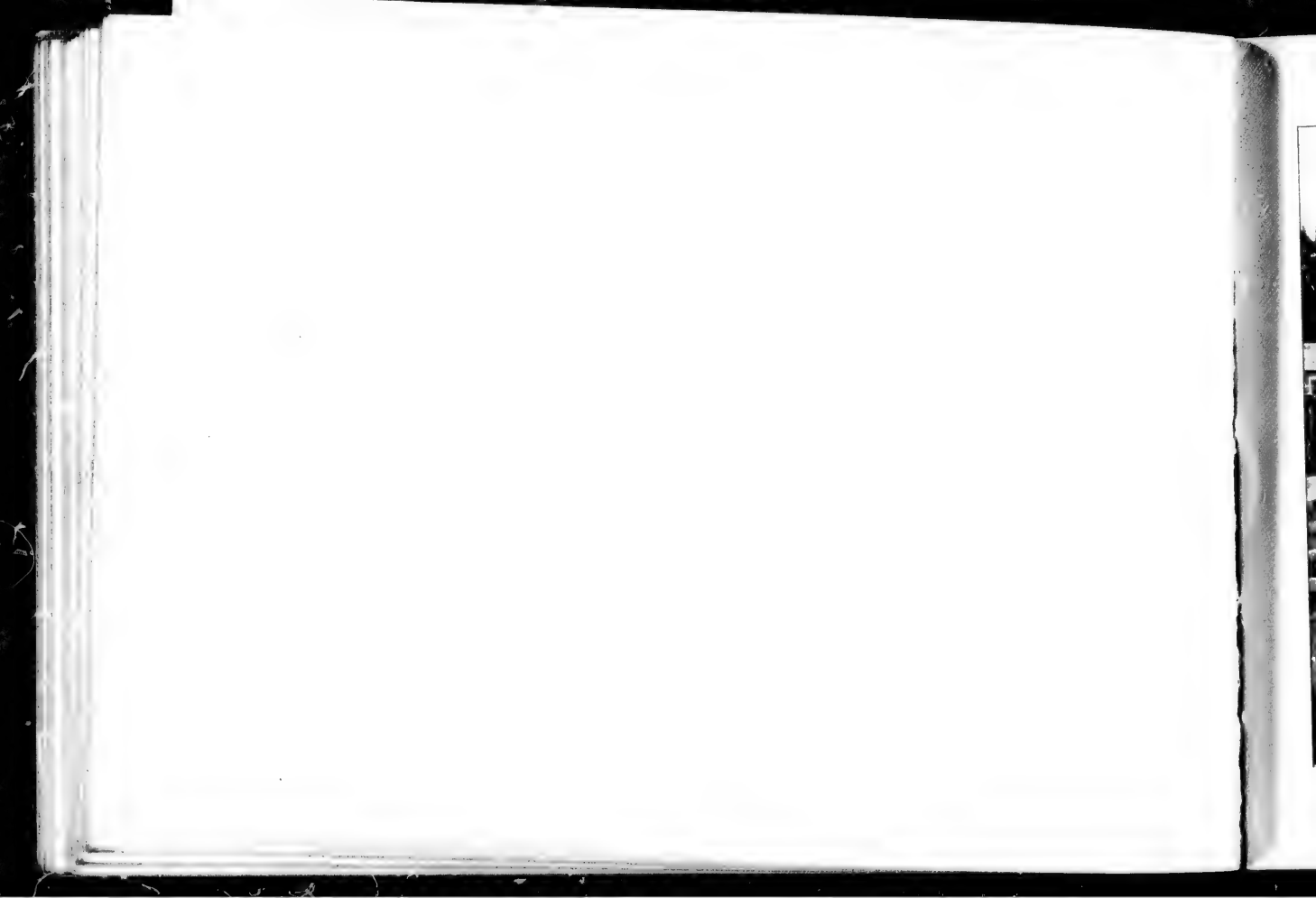
GROUND SLUICING. This is done without any sluice boxes, the water being turned right on the ground, washing away the dirt and leaving the gold.





96 COPYRIGHT 1895 BY VEAZIE WILSON

SCENE AT FORT YUKON. Fort Yukon is at the mouth of the Porcupine River
and just within the Arctic Circle.



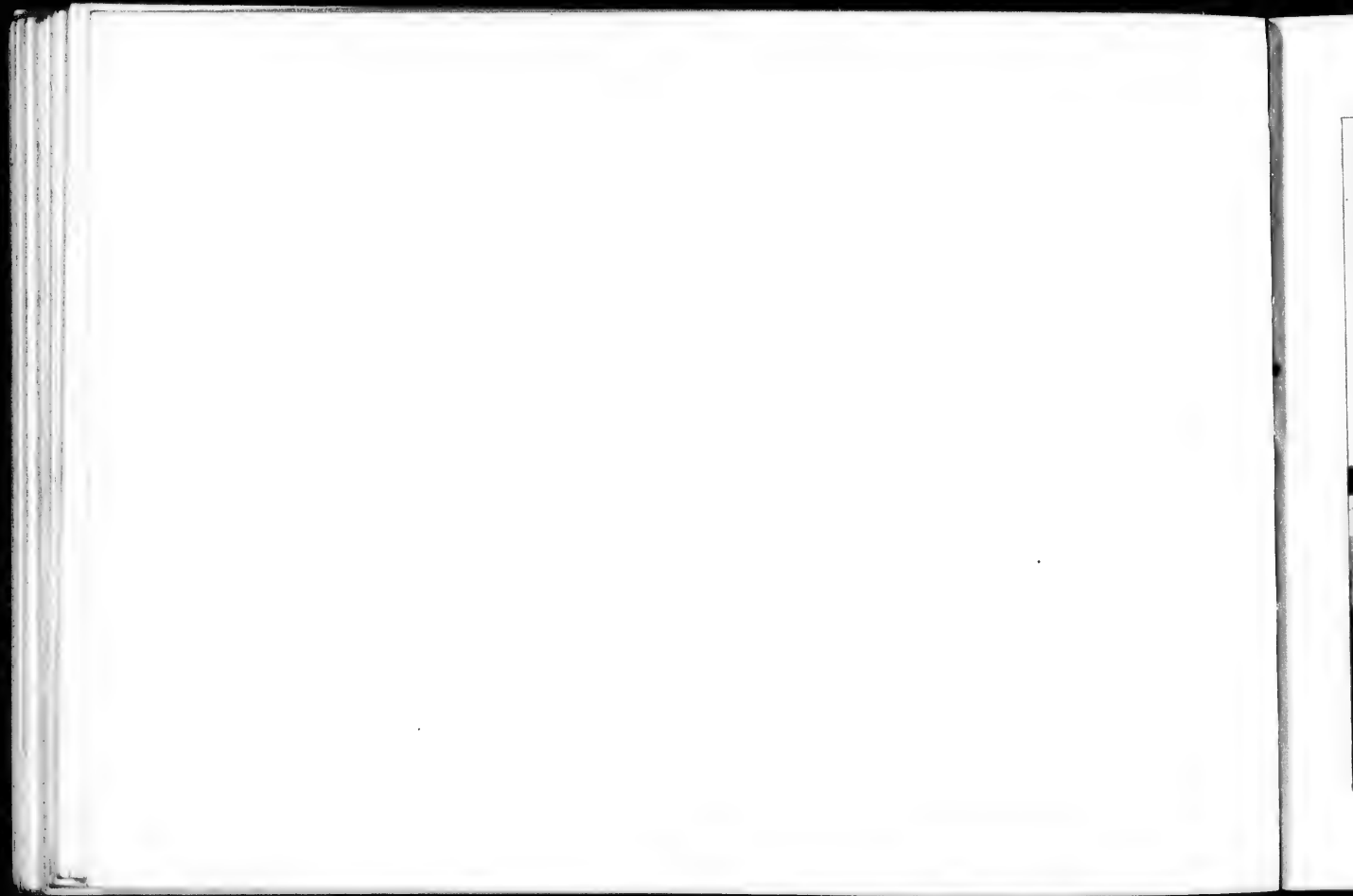


RUSSIAN MISSION. Lower Yukon. The Greek Church has the largest number of churches and adherents in Alaska, the Russian Government supporting the work.





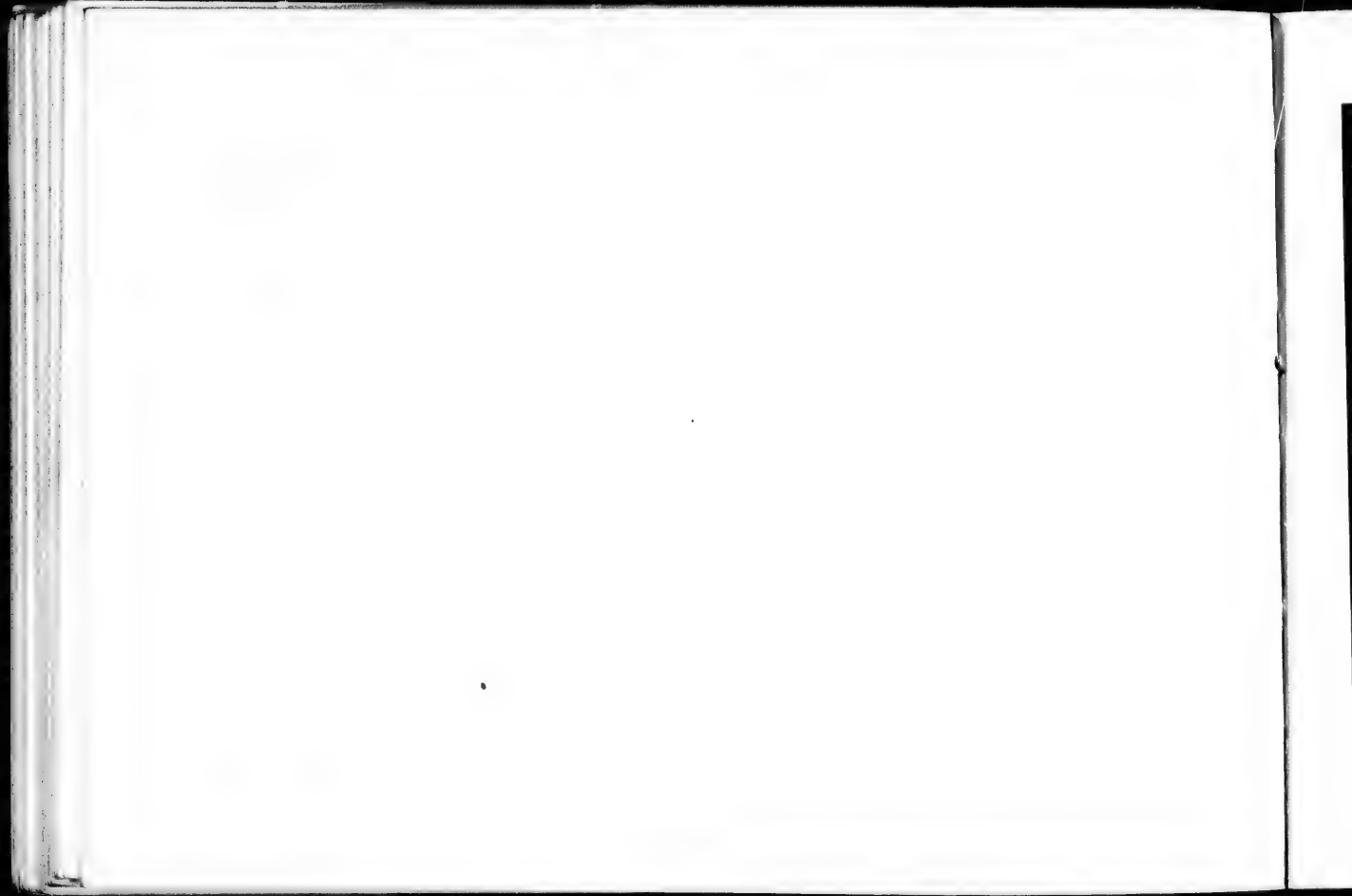
INDIAN TENTS. Lower River. At the Creole village of Kutlik.

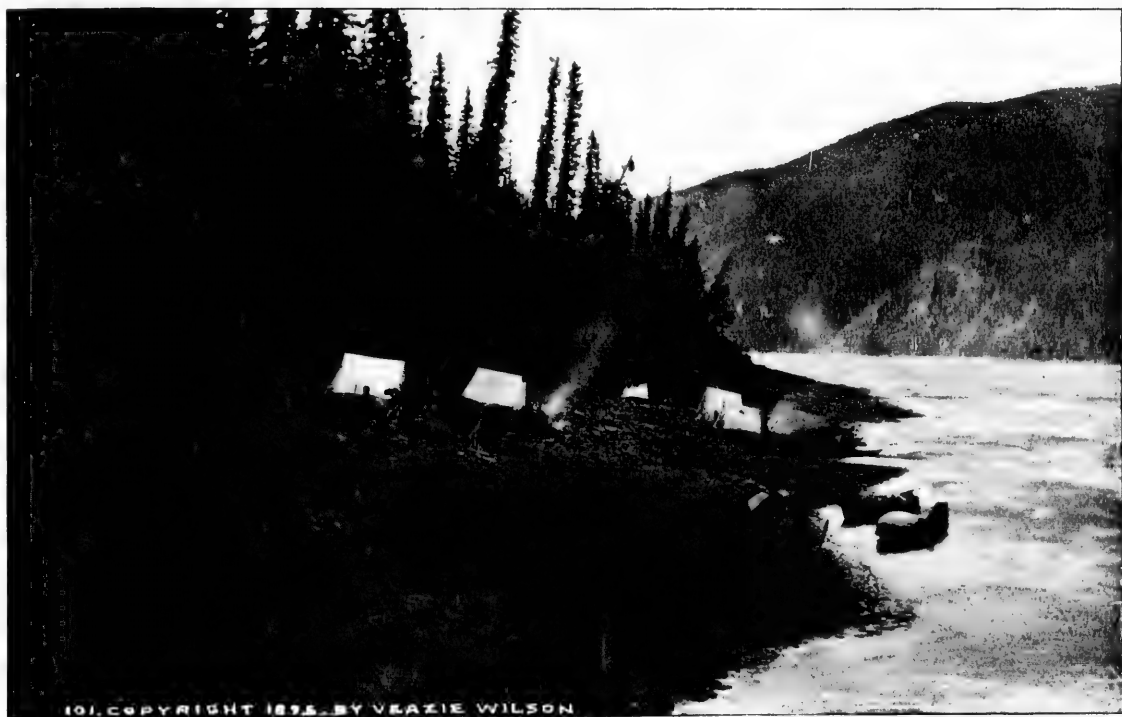




100. COPYRIGHT 1895 BY VEAZIE WILSON

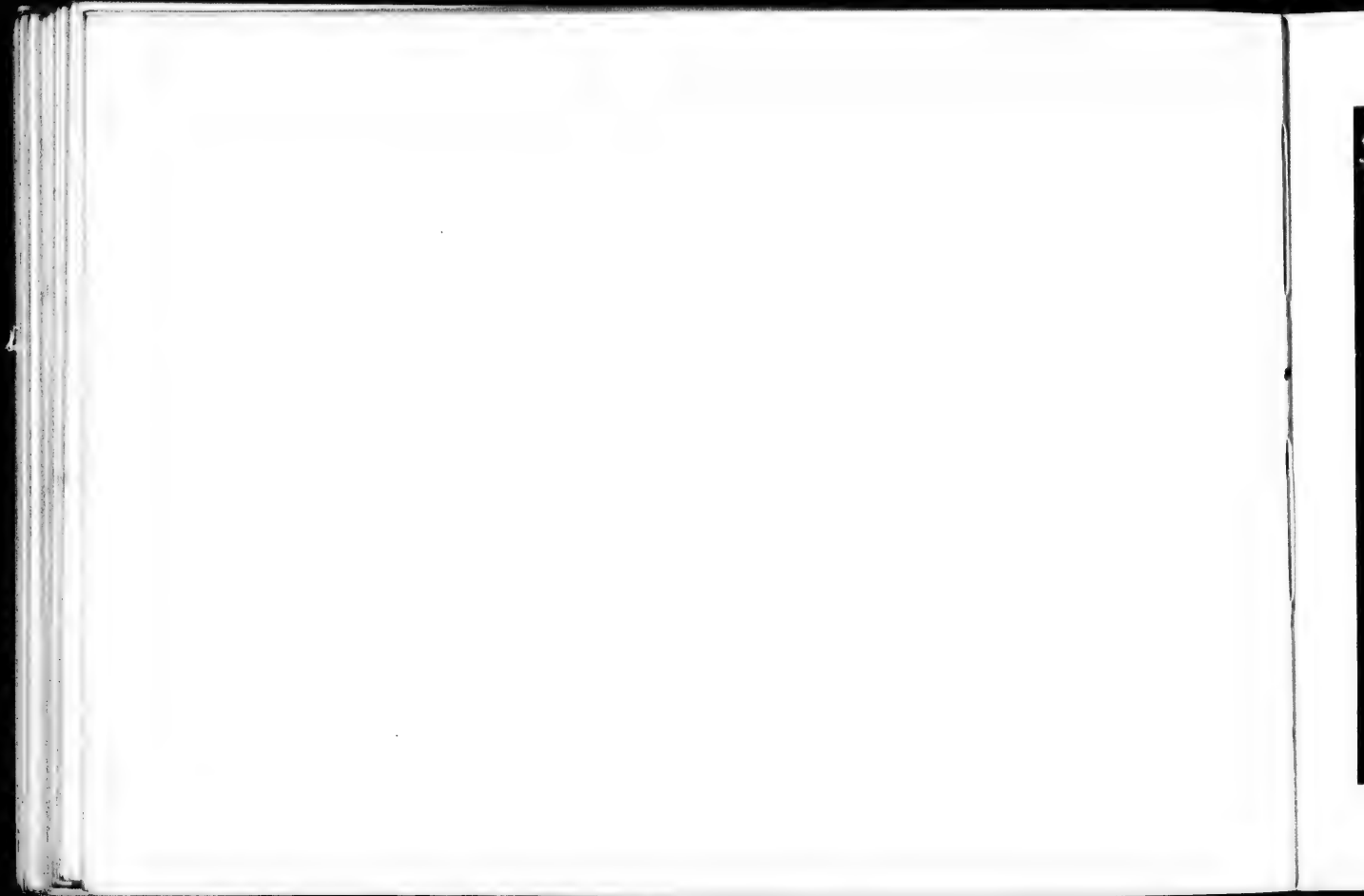
INDIAN FISHING VILLAGE. Lower River. The Lower River natives, excepting those of the missions, are filthy, degraded, and loathsome.

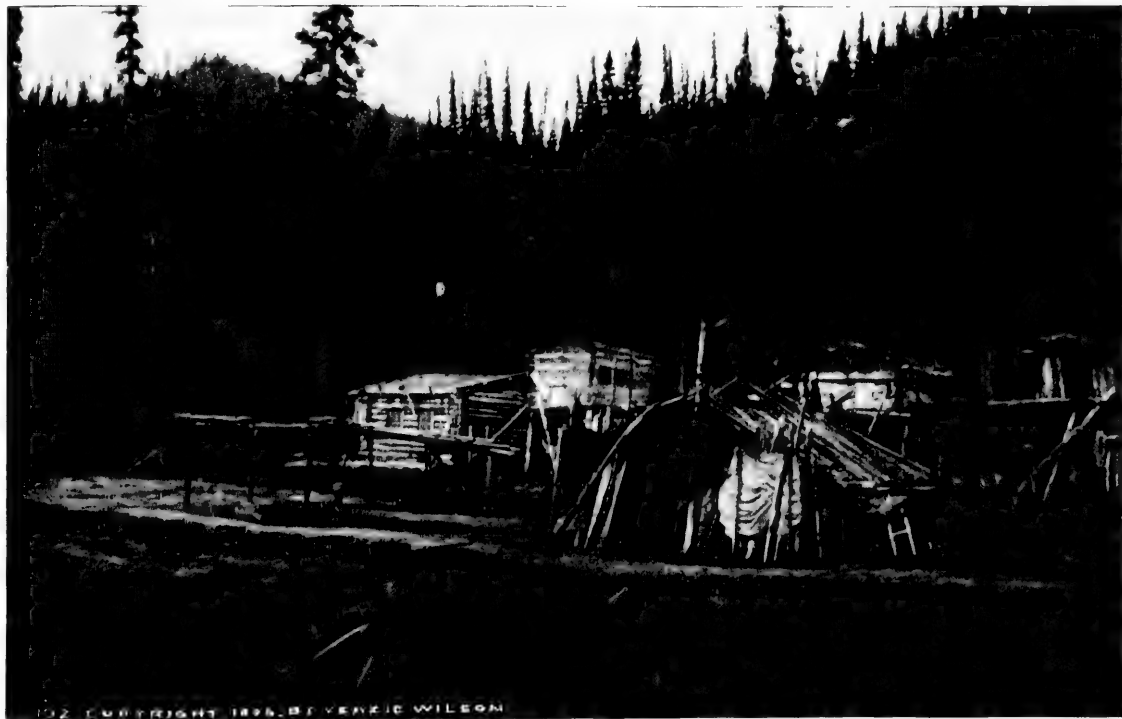




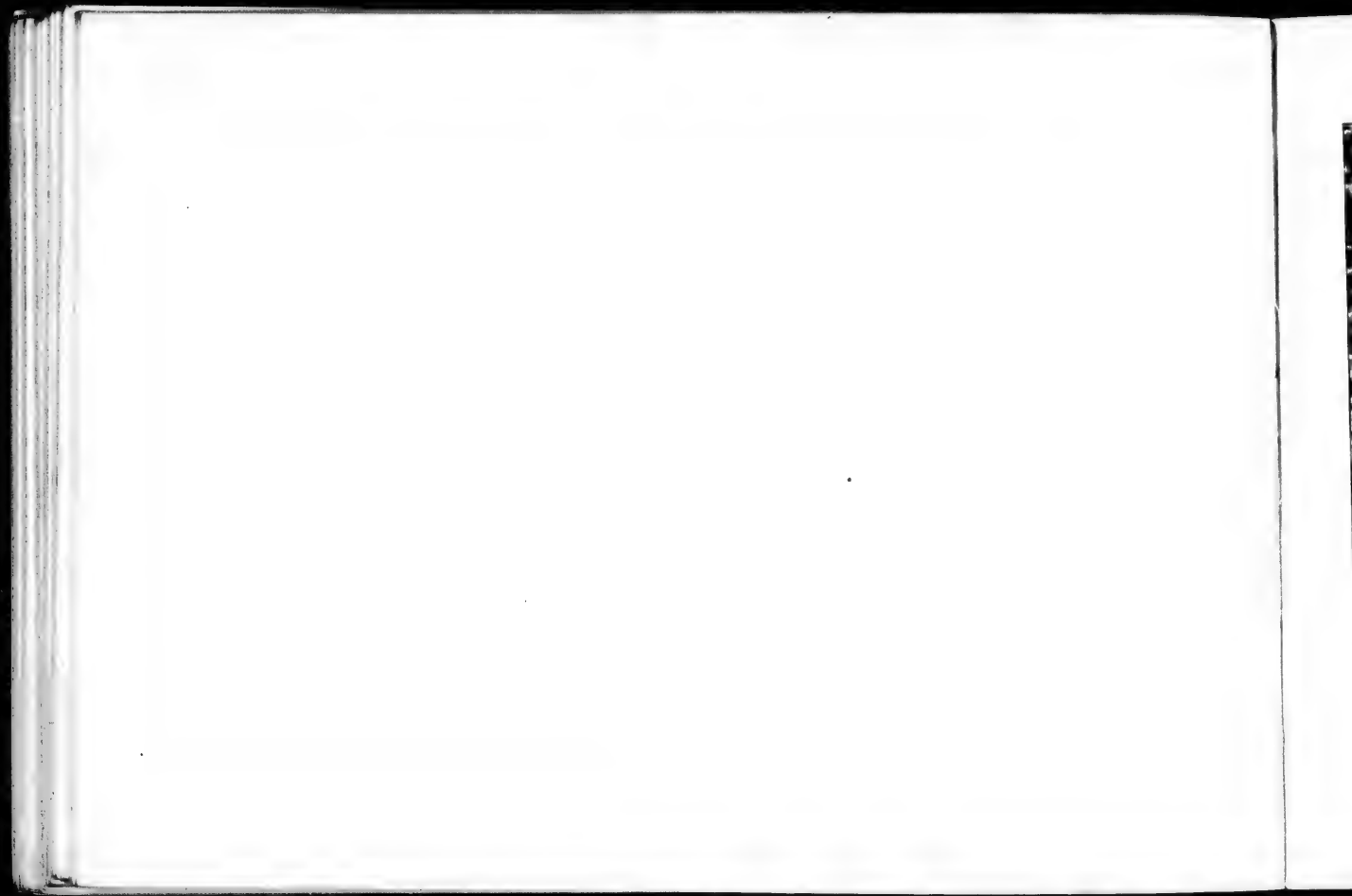
101. COPYRIGHT 1895 BY VEAZIE WILSON

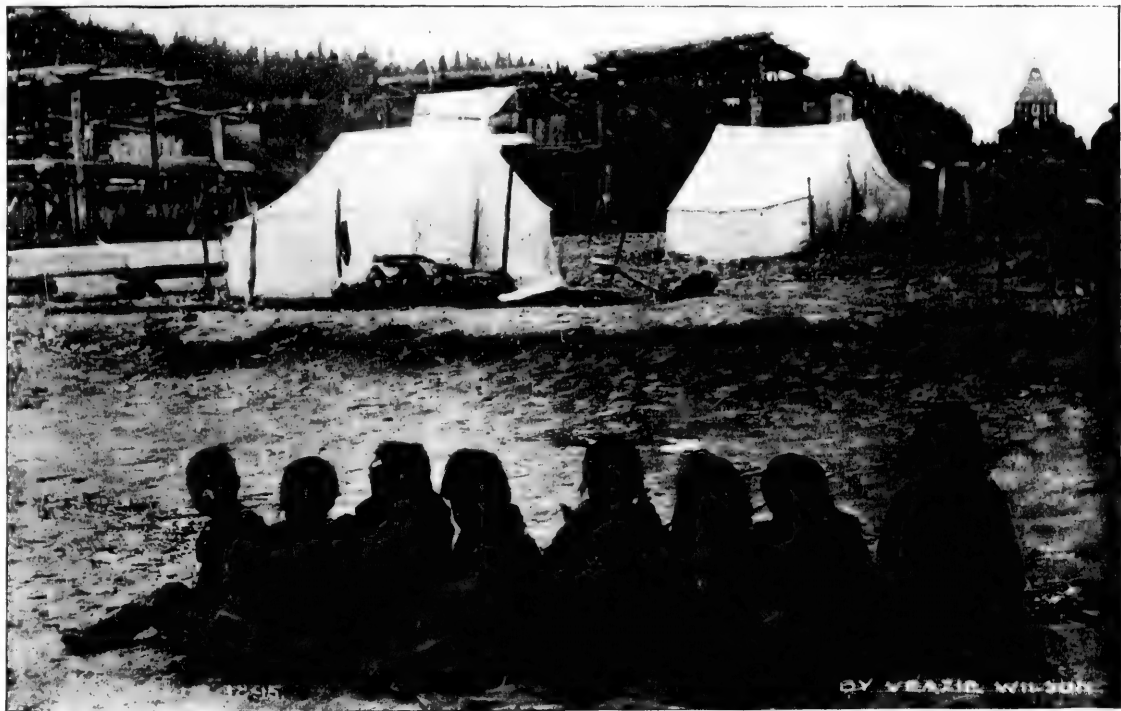
INDIAN CAMP, LOWER RIVER.





DRYING SALMON. Lower River. Showing caches. A cache is made by erecting a strong house upon posts twelve or fifteen feet above ground.



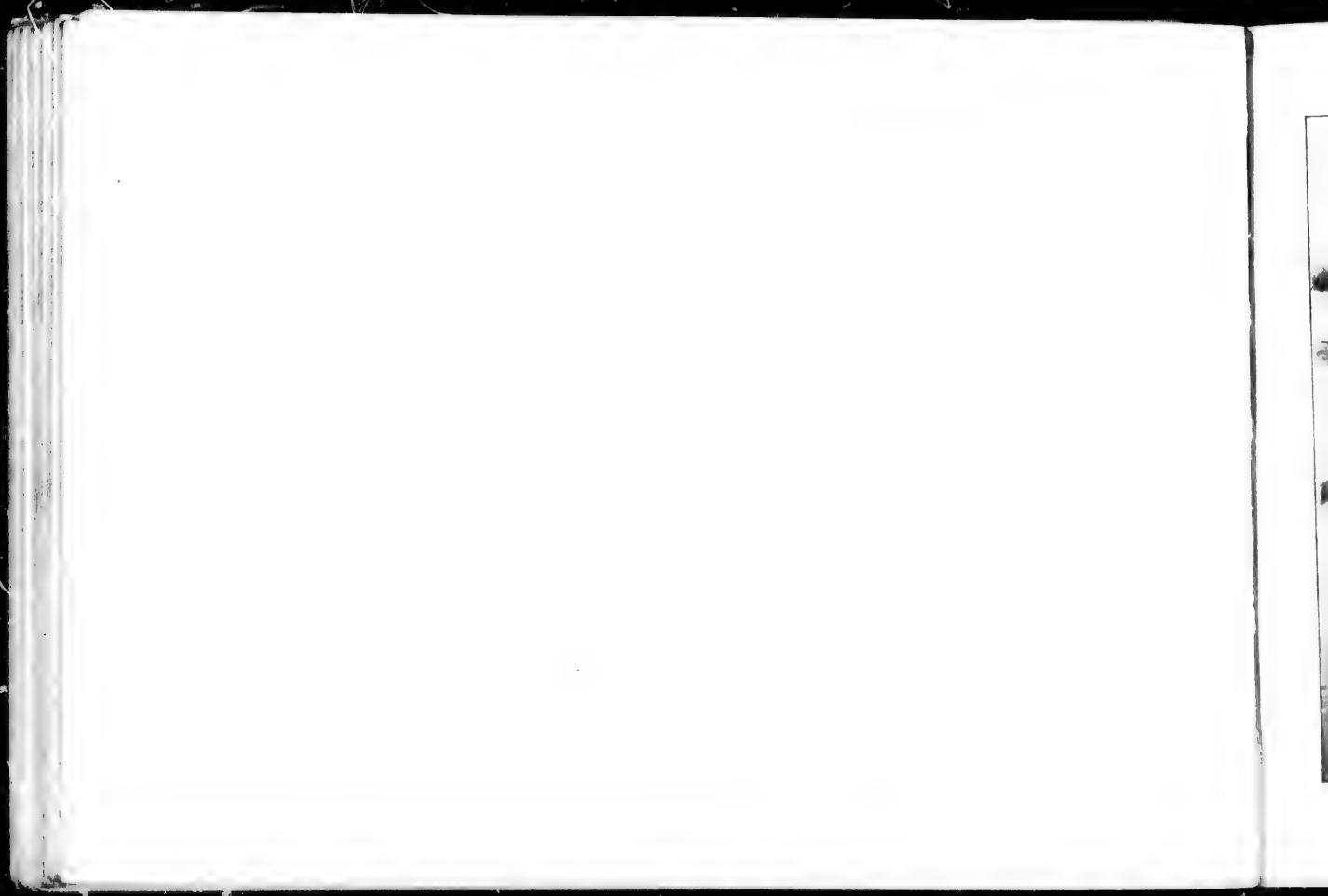


GROUP OF INDIAN CHILDREN. Lower Yukon.



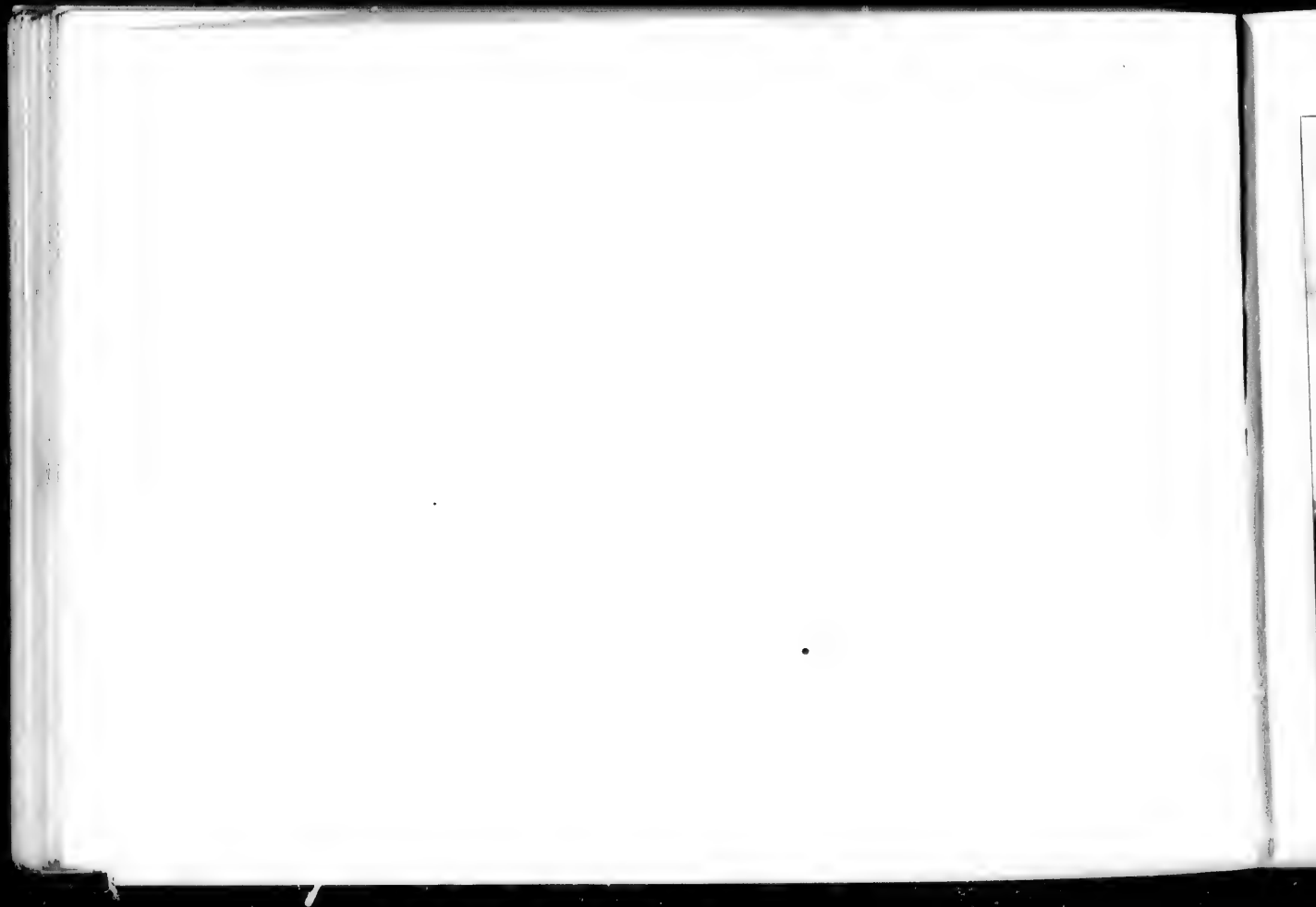


RUSSIAN CHURCH AT KUTLIK. Lower River. The interior of this church is very beautiful.



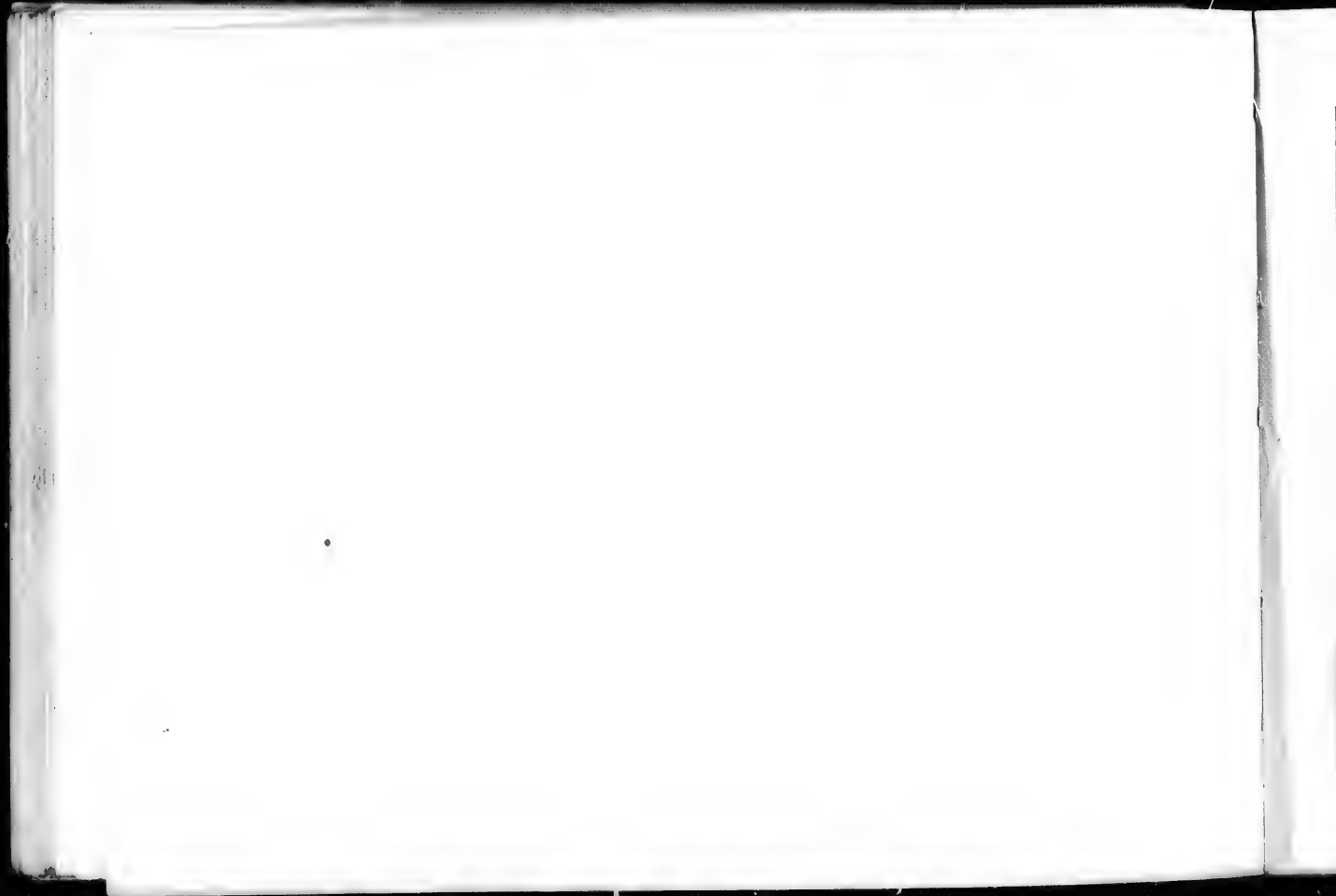


WOODING STATION. Lower River. Wood is about the only means of barter that the Lower River Indians have; it is very abundant along the banks of the river. Fur-bearing animals here are very scarce.



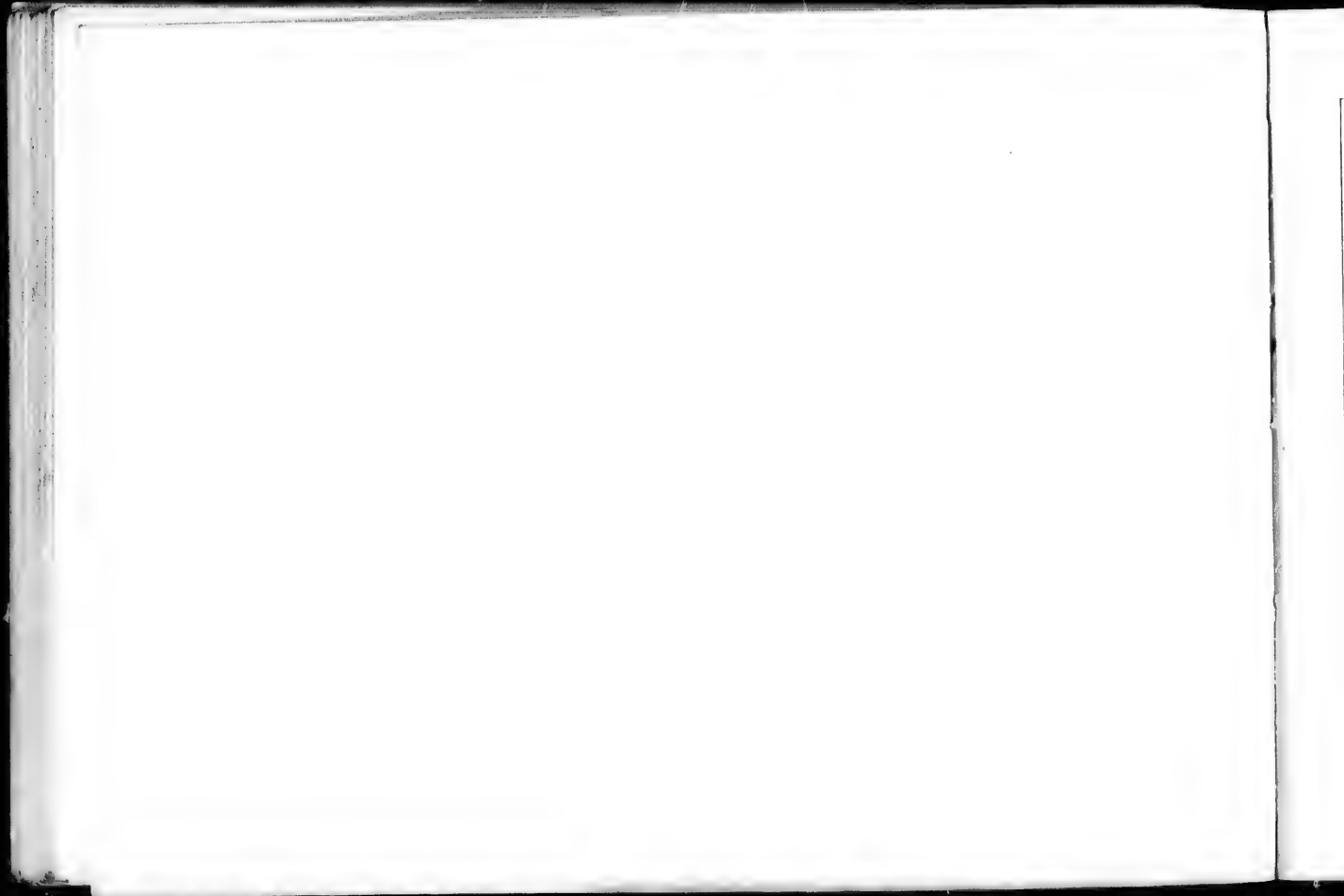


GROUP OF ESQUIMAUX. ST. LAWRENCE ISLAND.





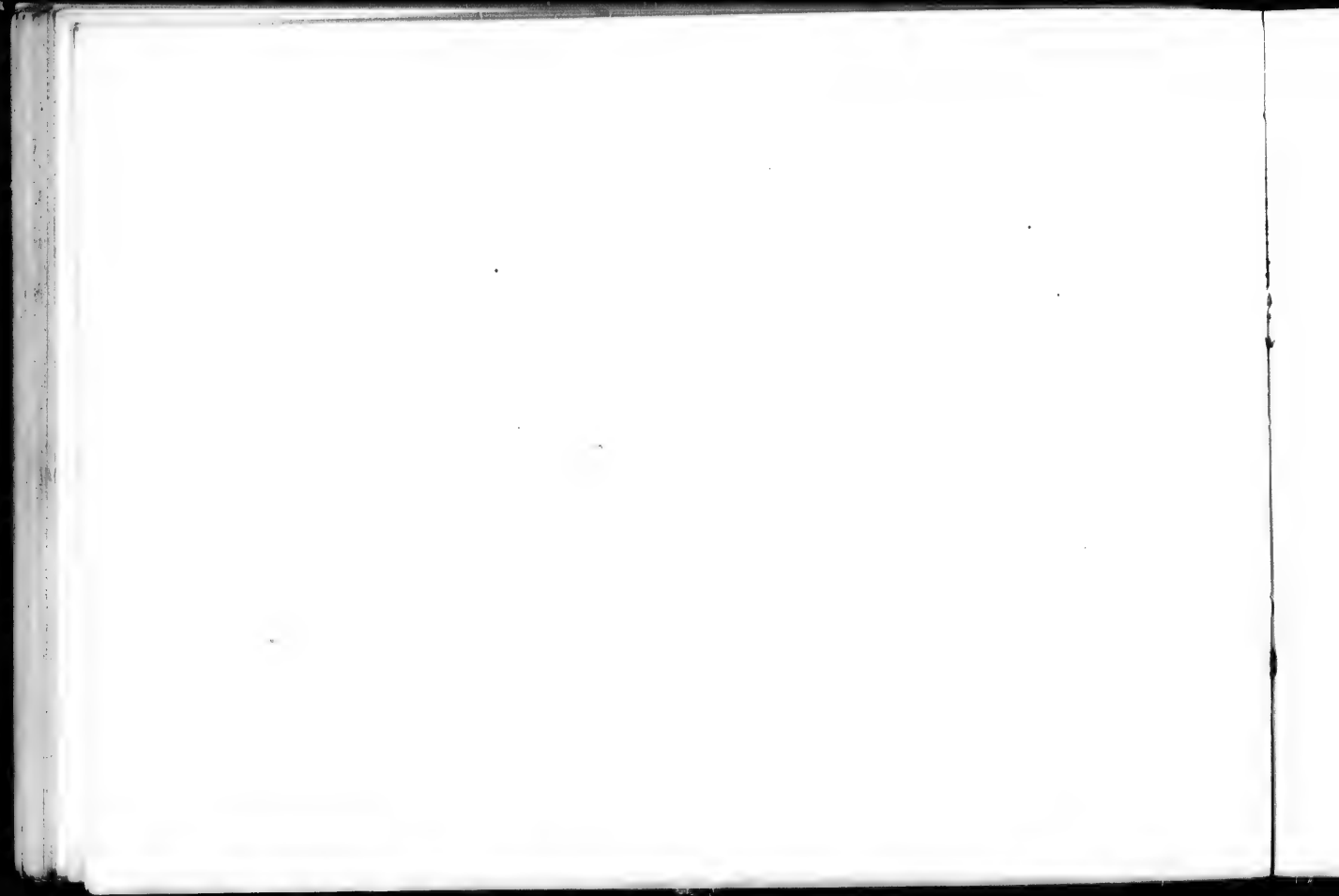
ESQUIMAUX HUTS, ST. LAWRENCE ISLAND.

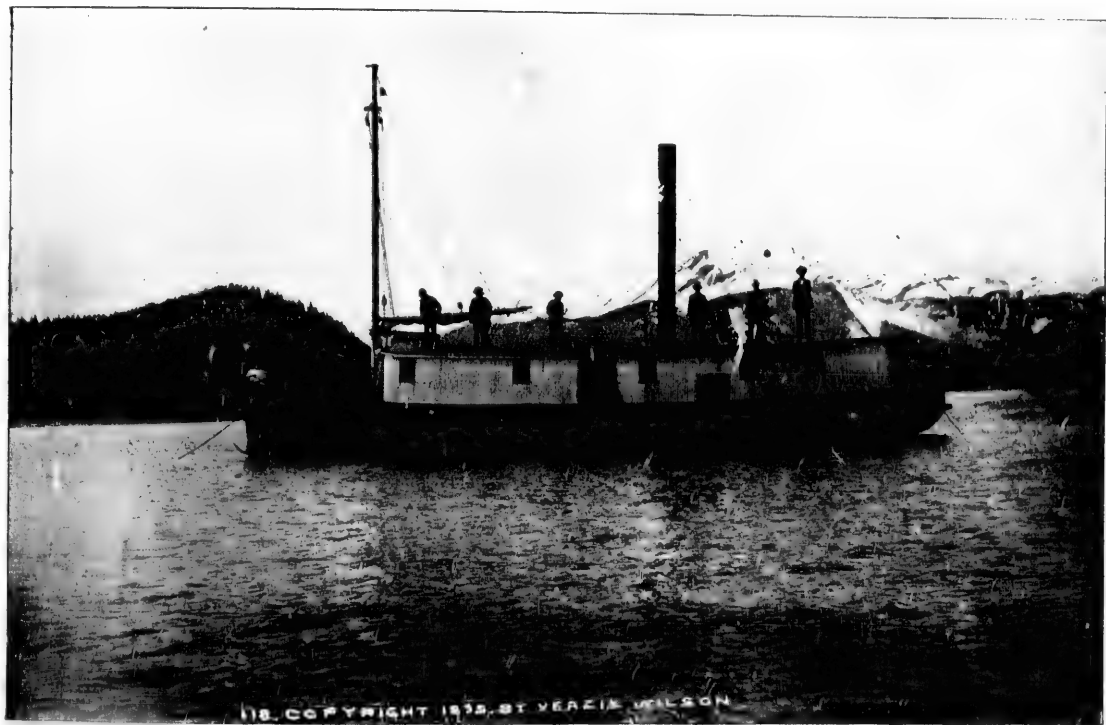




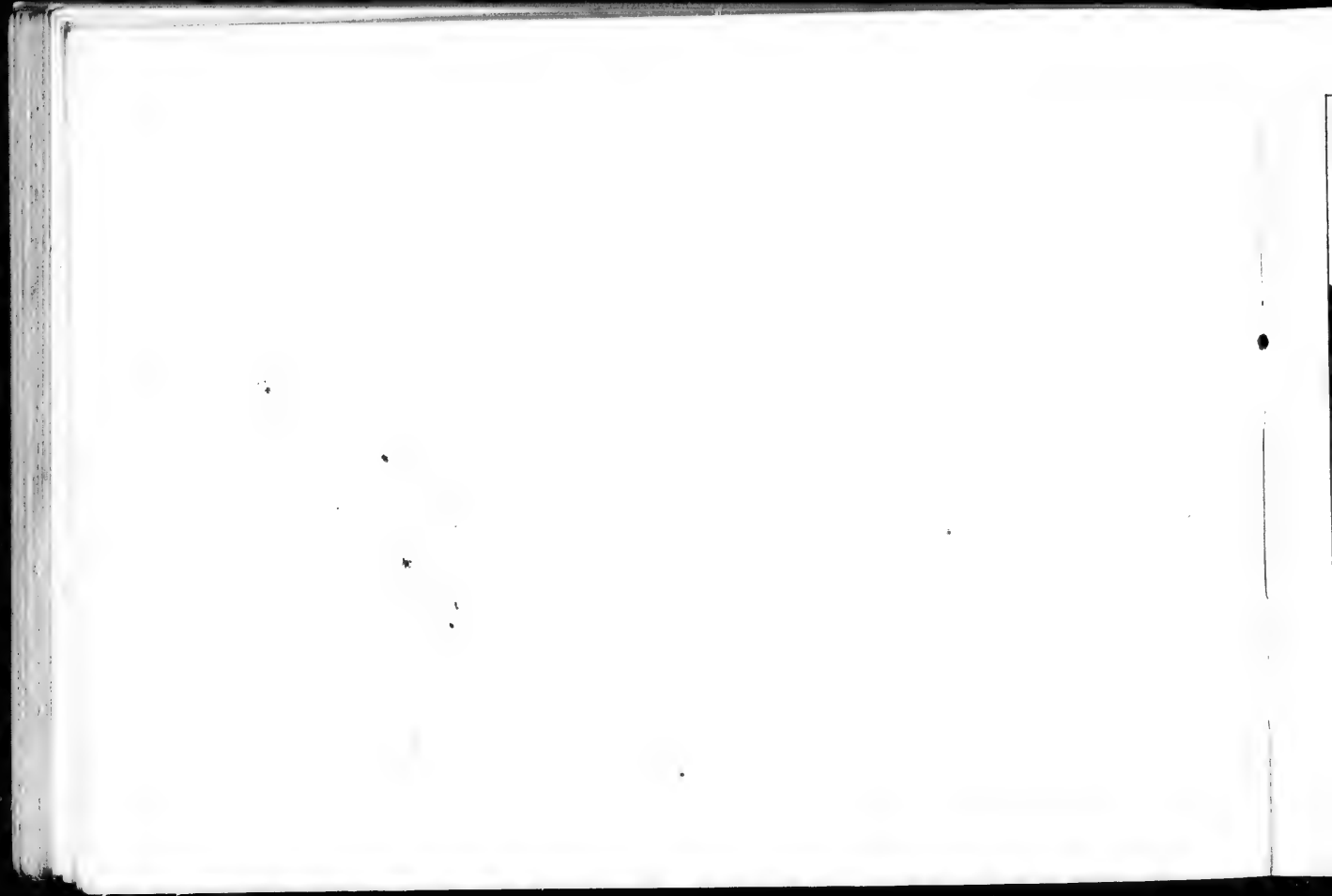
105. COPYRIGHT 1895 BY VERNIE WILSON

THE BELLE OF THE YUKON DISTRICT. AN ESQUIMAUX MAIDEN.





STEAMER SEAOLIN AT LITAUYA BAY.





GLACIER HEAD OF LITUYA BAY. Right-hand side. Alaska has the only forest-covered glacier in the world.



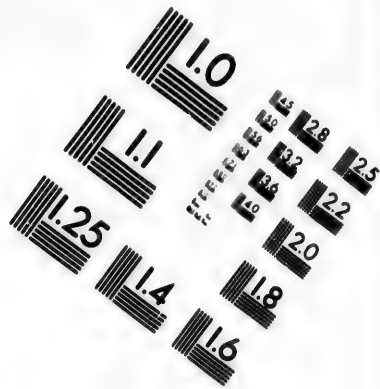
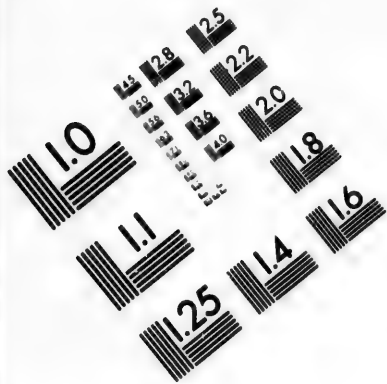
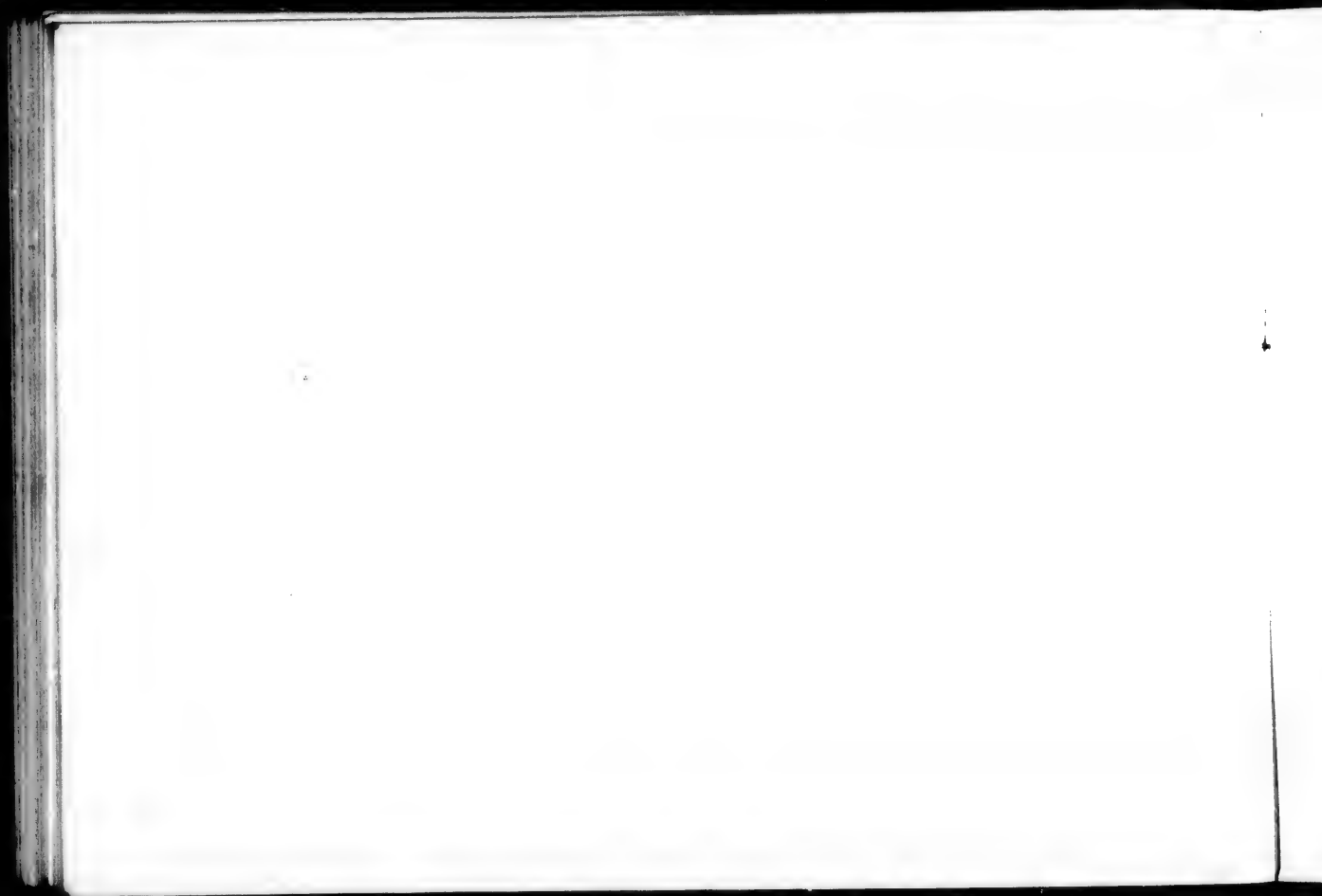


IMAGE EVALUATION TEST TARGET (MT-3)

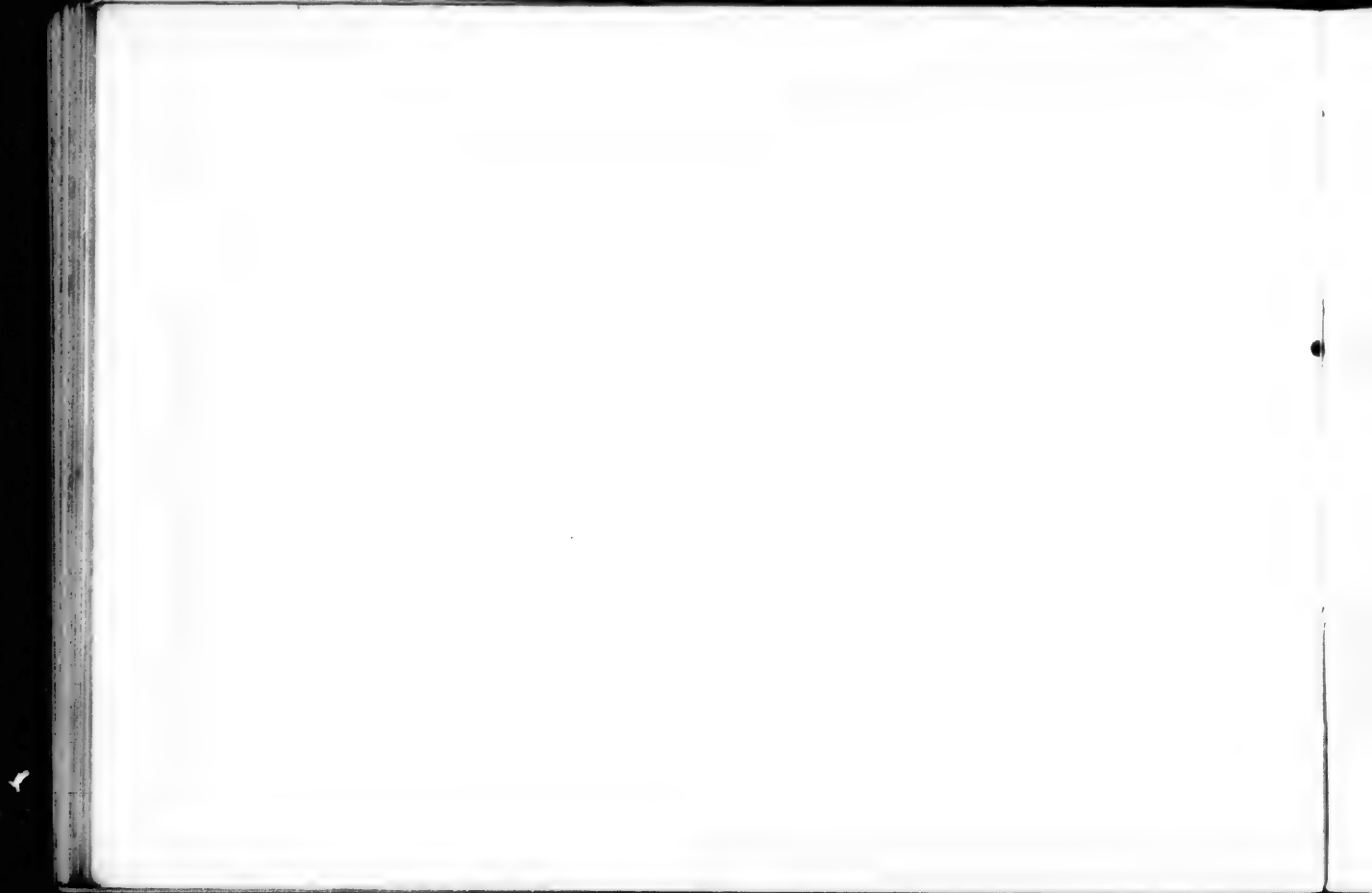


1.8 2.0 2.2 2.5 2.8 3.2 3.6 4.0 4.5 5.0 5.6 6.3 7.1 8.0 9.0 10.0 11.2 12.5 14.0 16.0 18.0 20.0 22.4 25.0 28.0 31.5 36.0 40.0 45.0 50.0 56.0 63.0 71.0 80.0 90.0 100.0





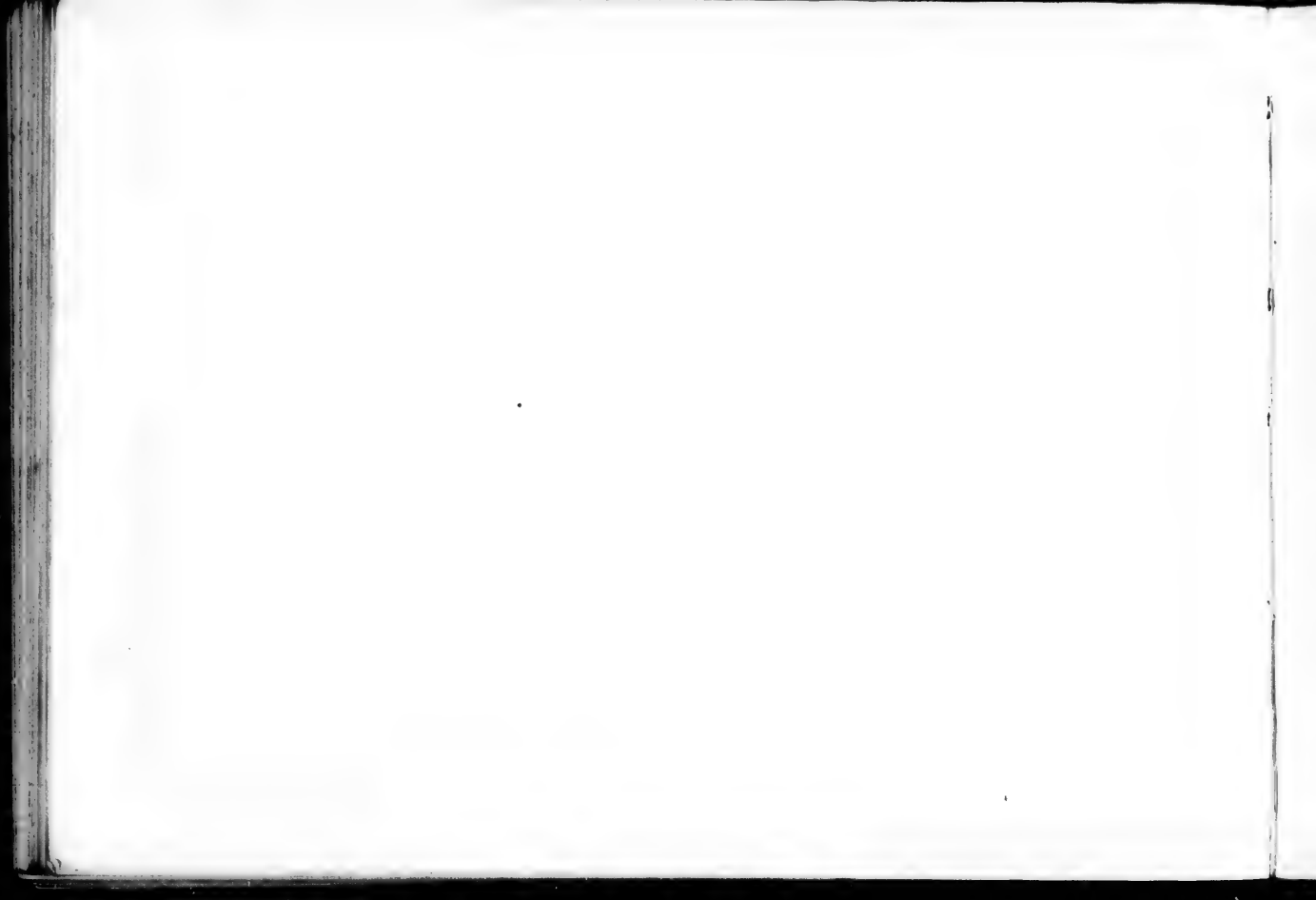
124. COPYRIGHT 1916 BY VERA M. HILSON
GLACIER HEAD OF LITAUYA BAY. Left side. Extends to the sea a distance of fifty miles, then breaks in a perpendicular wall of ice three hundred feet high and eight miles broad.





130. COPYRIGHT 1975. BY VERAIE WALTON

GLACIER LITAUVA BAY. The greatest glacier region in the world is in Alaska, the land of paradoxes, where can be seen alongside of a giant glacier, flowers of almost endless variety in bloom.





SITKA, THE CAPITAL OF ALASKA. This ancient capital of the Romanoffs is still the seat of Territorial Government. The principal object of interest is the Greek Church, presided over by a native Indian priest.





